

# The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

2554.—VOL. LIV.

LONDON, SATURDAY, AUGUST 2, 1884.

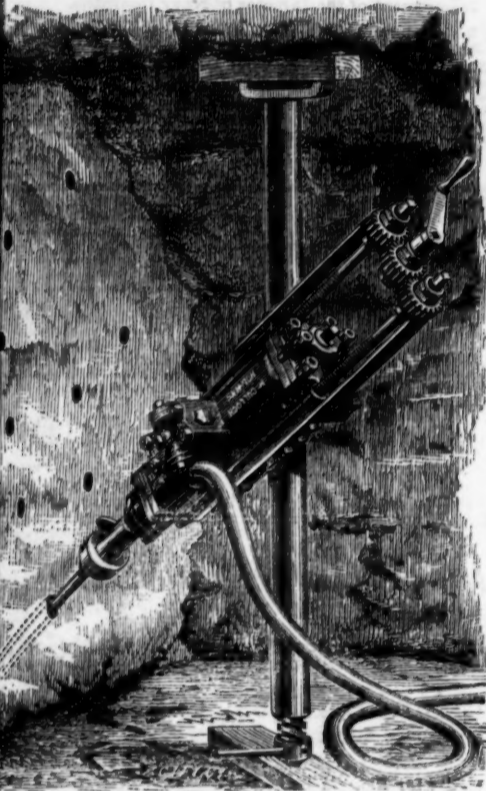
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SILVER MEDAL, ROYAL CORNWALL POLYTECHNIC  
Highest Award for Effectiveness in Boring, and Economy in  
the Consumption of Air.

JUBILEE EXHIBITION, 1882.

THE PATENT

"CORNISH" ROCK DRILL.



SILVER MEDAL AWARDED AT BORING COMPETITION, DOLCOATH MINE, 1881.

"CORNISH" ROCK DRILL and "CORNISH" COMPRESSOR

now largely in use, and in every case are giving entire satisfaction.

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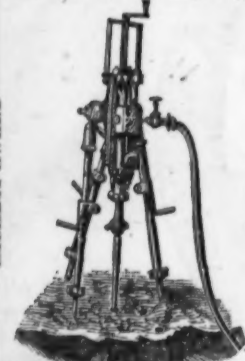
WELL & TREGONING'S PATENT PULVERISER, and HOLMAN'S  
IMPROVED STEAM or AIR PUMPING and WINDING ENGINE  
underground Quarries or Shallow Mining. Indispensable for  
Sinking with Rock Drills. Also makers of all kinds of  
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"CLIPSE" ROCK-DRILL

"RELIANCE AIR-COMPRESSOR."

Silver Medal awarded at Boring Competition, East Pool Mine, Sept. 1883.



Are NOW SUPPLIED to the  
ENGLISH, FOREIGN, and  
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in a number of the largest  
MINES, RAILWAYS, QUAR-  
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FOR ILLUSTRATED CATALOGUE AND PRICES, apply to—  
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STEPHEN DAVISON,

TIMBER MERCHANT, MORPETH,

to correspond with Company Promoters to establish Company  
to purchase land formerly occupied by an extensive  
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carry on the Business as TIMBER MERCHANTS, SAW MILL  
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first-class situation. Railway alongside. Certain to pay a large  
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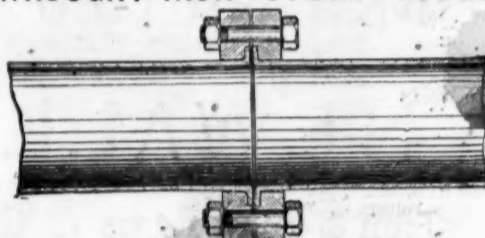
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## IMPROVED PATENT INGERSOLL ROCK DRILL MEDALS AND HIGHEST AWARDS.

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Rio de Janeiro Exhibition, 1875.  
Australia Brisbane Exhibition, 1876.  
Philadelphia Exhibition, 1876.  
Royal Cornwall Polytechnic, 1877.  
Mining Institute of Cornwall, 1877.  
Paris Exhibition, 1878.

WROUGHT-IRON STEAM TUBES.



TUBES FOR BOILERS, PERKINS'S, and other HOT-WATER SYSTEMS.

For Catalogues of Rock Drills, Air Compressors, Steel or Iron Steam Tubes,  
Boiler Tubes, Perkins's Tubes, Pneumatic Tubes, Boring Tubes, and all kinds of  
Machinery and Mining Plant, apply to—

LE GROS, MAYNE, LEAVER & CO.

60, Queen Victoria Street, London, E.C.

NEW PATENT

Stone Breakers and Grinding Machinery.

CAUTION TO PURCHASERS.

Do not buy any Stone Breaker or Pulverising Machines until you  
have seen ours. Price Lists and Testimonials free on application.

A Machine as will break 40 tons per day for £45.

MACHINES LET OUT ON HIRE, OR ON THE HIRE  
SYSTEM.

Apply S. MASON and Co.,

STONE MACHINE WORKS, LEICESTER, ENGLAND.

MACHINES MADE WITH SECTIONAL FACED JAWS,  
OR ANY OTHER.

## ROCK DRILLS FOR HAND AND POWER.



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32, QUEEN VICTORIA STREET,  
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## AIR COMPRESSORS,

With R. SCHRAM'S  
Patent

Inlet and Outlet Valves.

BOILERS, TURBINES.

SCHRAM'S IMPROVED

ROCK DRILL.

1600 in Use in all Parts of the World.

Complete Rock Boring Plants of the most  
approved construction for Railway Tunnels,  
Quarries, Shaft Sinking, Level Drilling,  
Stopping, and Submarine Blasting.

All Kinds of Mining Machinery.

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LATE

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THE  
VORTEX  
TURBINE

A most efficient means of applying Water Power to all kinds of  
Machinery.

Largely used in DRIVING AIR COMPRESSORS, PUMPING,  
WORKING ORE-CRUSHING MACHINERY, and for other pur-  
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Successfully used in ELECTRIC LIGHTING, and in utilising  
DISTANT WATER POWER by means of ELECTRICITY.

A Pamphlet containing a full description of the Vortex, with so-  
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application.

"THE PATENT ACCESSIBLE"

CENTRIFUGAL PUMP

Is the only Pump from which the disc can be removed by  
breaking the joint on a single face only.

Manufactured by CHARLES L. HETT,

HYDRAULIC ENGINEER,

Maker of

IMPROVED CENTRE VENT

TURBIN

WATER WHEELS,

Horse, Steam and Wind Power

PUMPS.

Catalogues on Application.



ANCHOLME FOUNDRY, BRIGG,  
ENGLAND.

# BELL'S ASBESTOS.

**BELL'S PATENT ASBESTOS BLOCK PACKING for High-Pressure Engines.**

The following testimonials refer to this Packing:—  
New Zealand Shipping Co. (Limited),  
S.S. "Ruapehu," Royal Albert Dock, 19th May, 1884.

Bell's Asbestos Works, Southwark.  
GENTLEMEN,—I beg to state that your round Asbestos Block Packing was used in the high-pressure pistons of this ship with the following remarkable results:—  
14,000 miles continuous steaming without renewal.  
Steam pressure ... .. 110 lbs.  
Vacuum ... .. 29 inches.

My experience does not show an equal result from any other packing. The voyage from New Zealand to Plymouth was accomplished in 37 days 22 hours, being the fastest run from New Zealand on record.  
Yours obediently, D. HENDERSON, Chief Engineer, S.S. "Ruapehu."

Manchester, Sheffield, and Lincolnshire Railway—Steamship Department,  
Grimsby, April 10th, 1884.  
DEAR SIR,—I have much pleasure in stating that after a trial of over nine months, and comparing it with other packings, I can confidently recommend your Asbestos Packing. It is especially valuable when high pressures are employed, as in cases where other packings have perished, owing to high temperatures, your packing has invariably stood well. I have also used it with complete success when a gland has heated with other packings, and also in cases of badly scored piston rods. I consider the results I have obtained by its use for our marine engines to have been in every way highly satisfactory.  
Yours truly, G. H. CLARKE, Sup. Engineer.

Department of the Director of Navy Contracts,  
Admiralty, Whitehall, 20th June, 1884.  
SIR,—I have to inform you that your tender has been accepted for Bell's Rolled Cloth Asbestos Packing to sample submitted:—Elastic core ... .. Square.  
" " " " " " Round.

To Mr. John Bell.  
The Patent Block Packing is square, as Fig. 1 and Figs. 2 and 3 represent the Round Block Packing with solid and hollow rubber core, and Fig. 4 without core, but with rubber inlay. As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears the Trade Mark.

**BELL'S ASBESTOS BOILER PRESERVATIVE.**—This useful mixture by absorbing the free oxygen that is in the water entirely checks pitting and corrosion. It also disintegrates incrustation so immediately as to prevent its adhering to the plates. Not only is a great economy of fuel effected by keeping boilers clean, but the risk of having the plates burned is thereby obviated. It has been computed that  $\frac{1}{4}$  in. thick of incrustation causes a waste of 15 per cent. of coal;  $\frac{1}{2}$  in., 60 per cent.;  $\frac{3}{4}$  in., 150 per cent. Thus the Preservative avoids the great risks which are inseparable from scaled plates, lengthens the life of a boiler, and covers its own cost a hundred-fold by economy of fuel. It is entirely harmless, and has no injurious action on metals. It can be put into the feed tank or boiler, as may be most convenient. Sold in drums and casks bearing the Trade Mark, without which none is genuine.

**BELL'S ASBESTOS YARN and SOAPSTONE PACKING** for Locomotives and all Stationary Engines running at very high speed with intense friction.  
Sandwell Park Colliery, Smethwick, 1st February, 1884.

To Bell's Asbestos Works.  
DEAR SIR,—I have much pleasure in stating that I have used your Asbestos Packing for the last 13 months for our large winding engines which are running night and day, and also for the fan, pumping, and hauling engines at the above Colliery, and during that period we have not used more than one-third the Packing we had formerly; and this I attribute to your Packing on account of its great durability and general excellence of quality.—I am, dear Sir, yours faithfully,  
THOMAS WINTER, Colliery Engineer.



**BELL'S ASBESTOS.**  
The goods of this house are of the highest quality only, and no attempt is made to compete with other manufacturers by the supply of inferior materials at low prices. All "home" orders should be sent direct to the undermentioned depots and not through Agents or Factors.

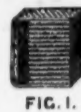


FIG. 1.



FIG. 4.

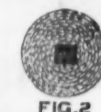
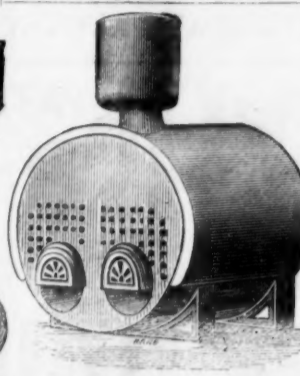


FIG. 2.



FIG. 3.

**BELL'S ASBESTOS BOILER and PIPE COVERING COMPOSITION.**  
coating every class of steam pipes and boilers, non-combustible and easily applied when the boiler is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other composition and is absolutely indestructible. It can be stripped off after many years' use, mixed up with water to the consistency required for use. The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

A Horizontal Boiler, 17 ft. 6 in. long, 15-H.P., gave the following results:—  
Temperature on Plates ... .. 186 deg.  
" Covering ... .. 94 deg.

One ton of coal was saved per week, and although the fire was raked out every evening 20 lbs. of steam were found in the boiler next morning.

The following Testimonials refer to this Covering:—

DEAR SIR,—It may interest you to know that we have exactly 48 per cent. in fuel through using your covering.  
The Tamar and Kit Hill Granite Company (Limited),  
Gunnislake, Tavistock, 25th April, 1884.  
Mr. John Bell, Southwark, S.E.  
SIR,—I have much pleasure in stating that the Asbestos covering applied by you to the boiler of our travelling crane at Kit Hill has yielded most remarkable results. Since it has been applied we have saved fully half our coal, and have effected a great saving in the time it takes to get steam, which is often a matter of great importance to us. I should add that the crane runs high gentries, and is fully exposed to all weather. I have formed the highest opinion of your Asbestos as used for this purpose, and as you are aware, have had another boiler similarly covered though it has not since been used. I can most strongly recommend the material.  
I am, Sir, yours faithfully, W. J. CHALK, Assoc. M. Inst. C.E., Engineer and Manager.

**BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE SHEETING** for making every class of Steam and Water Joints. It can be used hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors. It is kept in stock in rolls of 100 ft.,  $\frac{1}{4}$  in. to 3 in. wide, and any thickness from  $\frac{1}{4}$  in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary. The material is made up into sheets about 40 in. square, and each sheet bears the Trade Mark without which none is genuine. It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with the inferior articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears the Trade Mark.

**BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD** for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made sheets measuring about 40 in. square, from 1-64th in. to 1 in., and  $\frac{1}{4}$  millimetres thick. Each sheet bears the Trade Mark.

The following copy of acceptance of tender refers to above:—

Department of the Director of Navy Contracts,  
Admiralty, Whitehall, S.W., 17th May, 1884.

SIR,—I have to inform you that your tender for Asbestos Millboard has been accepted.—Mr. John Bell.  
JOHN COLLETT, Director of Navy Contracts.  
**BELL'S ASBESTOS EXPANSION SHEETING (PATENT).** This Sheeting is another combination of Asbestos with India-rubber, giving to the user the special advantages of both materials. The India-rubber Washer is protected from the action of heat and grease by an outer coating of vulcanised Asbestos thus producing an excellent joint where expansion and contraction render other materials unserviceable. This material is admirably suited to steam pipe joints of every class of valve. Valves made of this material are very durable, as they are not subject to injury by oil.

## BELL'S "ASBESTOS LUBRICANT"

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

**BELL'S ASBESTOS WORKS, SOUTHWARK, LONDON, S. E.**

OR THE DEPOTS—118a, SOUTHWARK STREET, S.E.

Victoria Buildings, Deansgate, MANCHESTER.

11 and 13, St. Vincent Place, GLASGOW.

39, Mount Stuart Square, CARDIFF.

21, Ritter Strasse, BERLIN.

## R. S. NEWALL AND CO.,

Sole Patentees of Untwisted Wire Rope.

**Iron & Steel Ropes of the highest quality for Collieries, Railways, Suspension Bridges, &c.**

PATENT STEEL FLEXIBLE ROPES AND HAWSERS.

IRON STEEL, AND COPPER CORDS. LIGHTNING CONDUCTORS.

COPPER CABLES of high Conductivity for Electric Light and Power.

London: 130, STRAND, W.C.

Liverpool: 7, NEW QUAY.

Glasgow: 68, ANDERSTON QUAY.

MANUFACTORY: GATESHEAD-ON-TYNE.

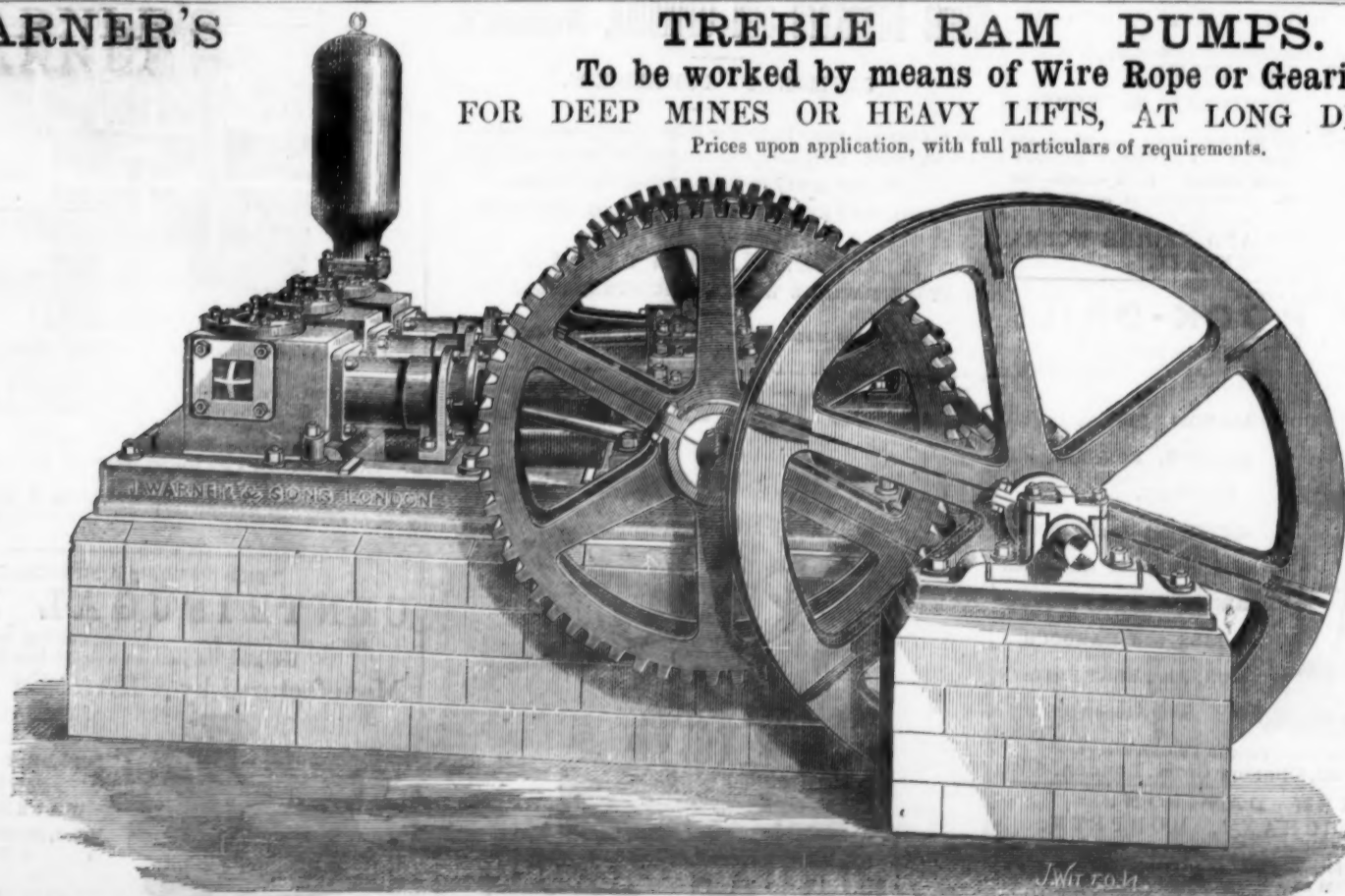
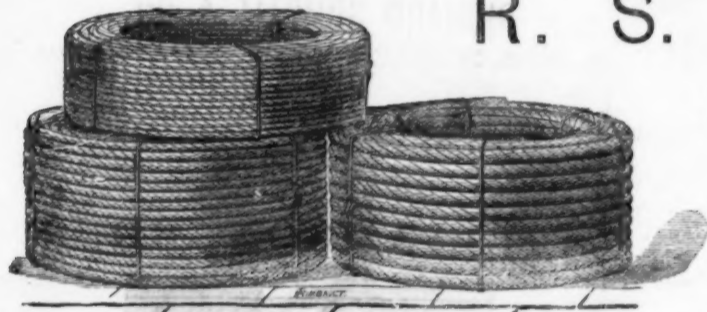
## WARNER'S

## TREBLE RAM PUMPS.

To be worked by means of Wire Rope or Gearing.

FOR DEEP MINES OR HEAVY LIFTS, AT LONG DISTANCES.

Prices upon application, with full particulars of requirements.



As supplied to Messrs BOWES, of Springwell Colliery, Gateshead, for a Lift of (600) Six hundred feet vertical through two miles of pipes.  
**JOHN WARNER AND SONS, THE CRESCENT FOUNDRY, CRIPPLEGATE, LONDON, E.C.**

# R. HUDSON'S

## Patent Steel Trucks, Points and Crossings, PORTABLE RAILWAY, STEEL BUCKETS, &c., &c.

Telephone No. 14.

In connection with the Leeds Exchange, and all the principal Hotels and places of business in the town.

**GILDERSOME FOUNDRY, NEAR LEEDS.**

(Near Gildersome Station, G.N.R. Main Line, Bradford to Wakefield and London, via Laisterdyke and Ardsley Junctions.)

Registered  
Telegraphic Address:—  
"GILDERSOME,  
LEEDS."  
A. B. C. Code used.

UPWARDS of 25,000 of these Trucks and Wagons have been supplied to the South African Diamond Mines; American, Spanish, Indian, and Welsh Gold, Silver, Copper, and Lead Mines; Indian and Brazilian Railways, and to Railway Contractors, Chemical Works, Brick Works, and Coal and Mineral Shippers, &c., &c., and can be made to lift off the underwork, to let down into the hold of a vessel, and easily replaced. They are also largely used in the Coal and other Mines in this country, and are the **LIGHTEST, STRONGEST**, and most **CAPACIOUS** made, infinitely stronger and lighter than wooden ones, and are all fitted with R. H.'s Patent "Rim" round top of wagons, requiring no rivets, and giving immense strength and rigidity. End and body plates are also joined on R. H.'s patent method, dispensing with angle-irons or corner plates.

Patented in Europe, America, Australia, India, and British South Africa, 1875, 1877, 1878, 1881, and 1883.  
N.B.—The American, Australian, Indian, and Spanish Patents on Sale.

**CAN BE MADE TO ANY SIZE, AND TO ANY GAUGE OF RAILS.**

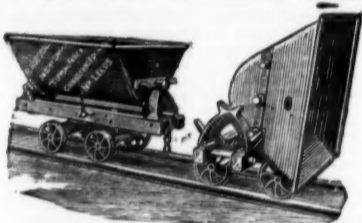
1.—PATENT STEEL END TIP WAGONS.



7.—PATENT STEEL MINING WAGONS.



2.—PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK.  
Will tip either SIDE or either END of rails.



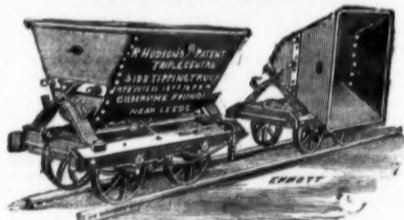
8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS.  
Will tip either side of Wagons.



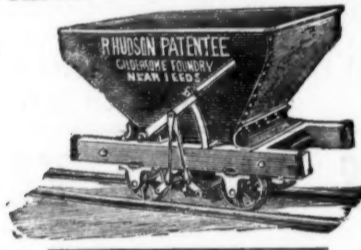
12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.



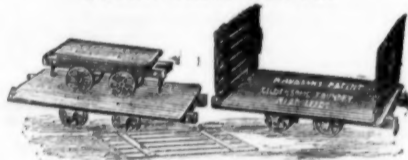
3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.



13.—PATENT STEEL HOPPER WAGON.



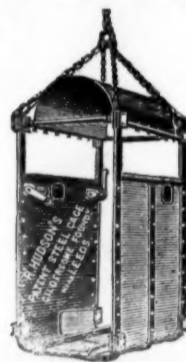
4.—PATENT STEEL PLATFORM OR SUGAR CANE WAGON.



14.—SELF-RIGHTING STEEL TIP BUCKET.  
(The "CATCH" can also be made SELF-ACTING if desired.)



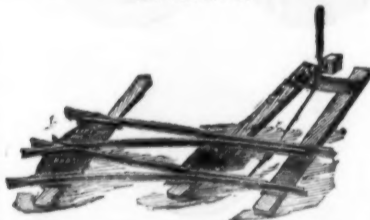
15.—STEEL CAGE.



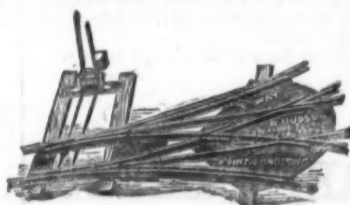
5.—PATENT STEEL CASK.  
As supplied to H.M. War Office for the late war in Egypt.  
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.  
(Made from 10 gals. capacity UPWARDS to any desired size.)



10.—LEFT-HAND STEEL POINT AND CROSSING.



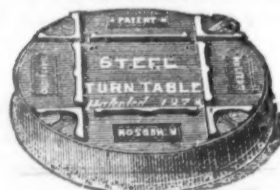
11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.



16.—PATENT STEEL WHEELBARROWS.  
Made to any Size.  
Lightest and Strongest in the Market.



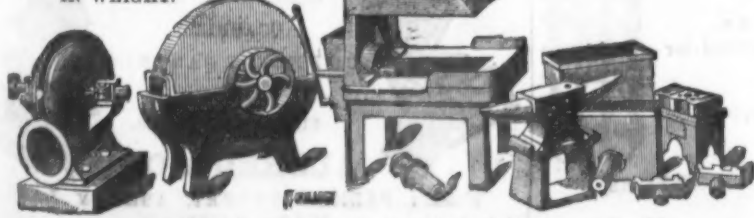
17.—STEEL SELF-CONTAINED TURNTABLE.



(Also made in CAST Iron for use where weight is not a consideration.)

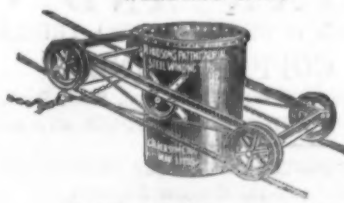
6.—ROBERT HUDSON'S PATENT IMPROVED IRON SMITH'S HEARTH.  
NO BRICKWORK REQUIRED.

A Special quality made almost entirely in STEEL, effecting a GREAT SAVING IN WEIGHT.



Large numbers in use by all the principal Engineers in this country and abroad.

18.—"AERIAL" STEEL WINDING TUB.



Largely employed in the South African Diamond Fields.

No. 19.—PATENT STEEL CHARGING BARROW, DOUBLE the STRENGTH & much LIGHTER than ordinary Barrows



**ALL KINDS OF BOLTS NUTS, AND RIVETS MADE TO ORDER ON THE PREMISES**

Pumping Engines  
for  
Mines, Water Works,  
Sewage Works,  
and  
General Purposes.  
CATALOGUES ON

# PUMPING & MINING MACHINERY. HATHORN, DAVEY, & CO., LEEDS.

Hydraulic Pumps,  
Winding Engines,  
Air Compressors,  
Man Engines,  
Capstans,  
&c., &c.  
APPLICATION.

## FRANCIS & JENKINS,

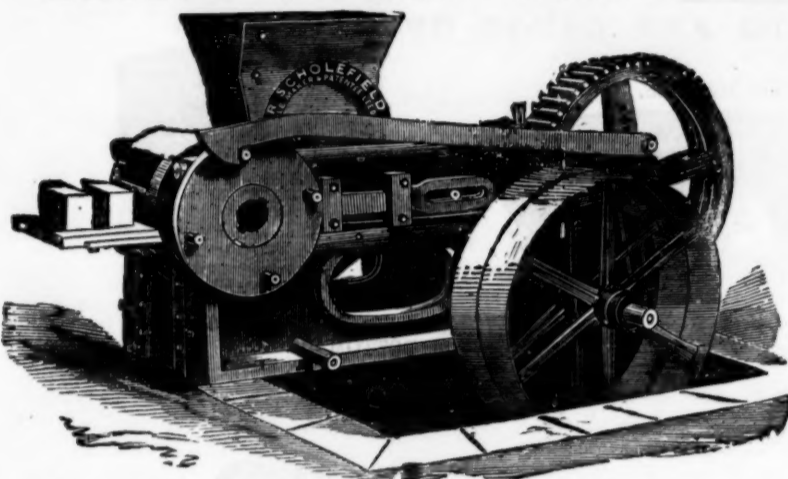
GREENFIELD WORKS, LLANELLY, SOUTH WALES.

Manufacturers of Steel-pointed Spades and Shovels, Draining and Grafting Tools, &c. Also Manufacturers of

### COPPER WORKS LADLES,

To which special attention is given. Rabble Heads, Paddles, and every description of Light Hammered Work.

## R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which instead of storing at the pit's mouth (and making acres of valuable land useless) is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, The following is about the cost of

production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	80	8	0
1 man grinding, 4s. 6d. per day	0	4	6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0	2	0
1 boy greasing, 1s. 6d. per day	0	1	6
1 engine-man, 6s. per day	0	5	0
1 man wheeling bricks from machine to kiln, 4s. per day	0	4	0

Total cost of making 10,000 pressed bricks ... .. £1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging. As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.  
SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS.  
KIRKSTAL ROAD, LEEDS.

## BAXTER'S PATENT KNAPPING STONE BREAKER.

THE LAST FOUR MEDALS AWARDED FOR STONE BREAKERS,



1881.



1881.



FACTS SPEAK FOR  
THEMSELVES.



Our Machine, tested by the Judges Calcutta, broke 7 tons in 45 minutes to 2 1/2 in. ring, and was awarded First Class Certificate and Gold Medal in competition with the Blake Machine.

The ONLY MACHINE which has never failed to do what it was guaranteed, and is also the ONLY MACHINE which has never had a driving shaft broken or the end sent out.

See our Machines now being exhibited at the Crystal Palace, London.

We shall be glad to receive any kind of stone ore or other material to be broken or by our Breaker or New Patent Fine Crusher.

We also exhibit at the Highland Show at Edinburgh in July.

PATENTEES AND SOLE MAKERS—

W. H. BAXTER & CO., ALBION STREET, LEEDS.

## MANCHESTER WIRE WORKS.

NEAR VICTORIA STATION, MANCHESTER.

(ESTABLISHED 1790).

### JOHN STANIAR AND CO.,

Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper.

EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.

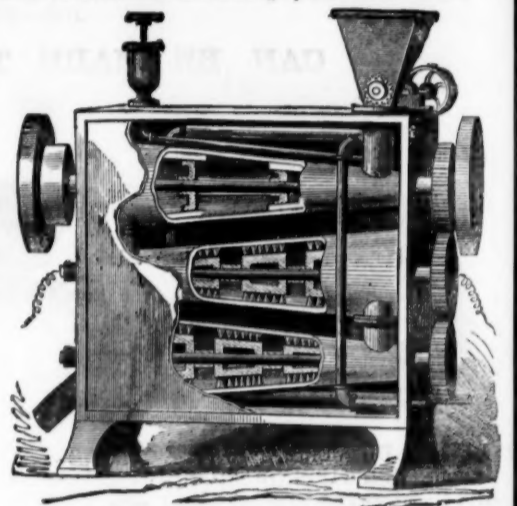
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## NOVEL ELECTRO METALLURGICAL MACHINE.

PROFESSOR JAMES MANES AND SONS call the attention of miners, mineowners, capitalists, and others interested in the working of gold or silver mines to their new Electro Metallurgical Machine for extracting fine and rusty gold from sands or tailings stamp mills, or the sands of hydraulic gold diggings, or from black sands on the coast of Oregon or California, and other parts of the world where gold is found.

The problem that has long troubled the worker of free-mill gold and silver ores is a method to save the mineral now lost in the tailings of stamp mills or flumes. This alone, if it could be saved, would amount to many million dollars profit each year, besides enabling the working of much territory which is now lying idle, and want of an economical and thorough process of treatment.



Prof. James Manes and Sons, of Denver, Colorado, U.S., have invented a machine (represented in the above engraving) which is claimed to save nearly the entire amount of mineral which passes through the loss not being over 10 per cent., and in many cases not in excess of half the amount. The machine is a cheap and practical process—it never needs stopping or cleaning up, being nearly self-acting. Steam, electricity, and mercury are used in the process of extracting the mineral.

This machine or amalgamator is adapted for free-milling gold or silver ore or refractory after roasting. It consists of a series of three or more large rollers, wider at one end than the other, placed one above the other in a horizontal position, a shaft or spindle running through the centre of each.

The ore and mercury are fed into the first cylinder, passing into the second and then to the third. The first cylinder is furnished with steel millers which nearly touch the sides of the cylinder, and revolve at a good rate of speed, rolling the mercury and ore. The second cylinder is furnished with large brushes attached to the shaft or spindle, revolving at a high rate of speed through this current of electricity is furnished by a Westinghouse dynamo machine, which materially assists in gathering the particles of very fine gold together, and thoroughly amalgamating the metal and mercury. The third cylinder is similarly furnished to the second; into this the amalgam passes, and is again acted upon and mixed by the brushes to catch any gold which may have escaped amalgamation in the second. A fourth cylinder may be used if found necessary.

The amalgamated pulp then passes through a revolving copper drum, placed with quicksilver inside. As the drum revolves it takes up the most part of the amalgamated gold. As the inside of the drum is constantly washed with a spray of water from perforated pipes fixed inside of said drum, a clean-plated surface is constantly brought in contact with the pulp or tailings as it passes out by the cylinders. After leaving the drum it falls down on to incline copper plates the same as is now used in stamp mills.

The amalgam can be collected from the drum and plates without stopping the machine, and any live quicksilver that passes will be caught in syphons. The tailings are carried off with the water. The machine when attached to the first will be driven by the waste water; it sifts the fine sands from the coarse gold and amalgamates it as above.

The specific points claimed by Prof. Manes and Sons in their patent are:—

- 1.—The saving of almost all the mineral passing through the machine.
- 2.—The loss being less than 10 per cent.
- 3.—The entire absence of loss of the amalgamated material, thereby saving the mercury, which, with the processes now in use, there is a large loss both mercury and the precious metal.
- 4.—The small cost per ton at which the ore can be treated.

By the addition of the powerful current of electricity that passes off the revolving brushes, the most minute particles of gold will be caught and retained which in the ordinary flume and stamps passes off with the water; this amounts to a large percentage.

The inventors state that if English stock companies will give their assistance to work the black sands of Oregon and California, by paying for the building the machines, they will take a share of the gold for their services, or they will send their machines to any part of the world, or will sell patent rights to the desiring any of their patent machines or revolving furnaces for roasting smelting ores, ball pulverisers, &c.

Prof. James Manes and Sons are agents for the Morey and Spence Ball Pulveriser, that crushes and pulverises at the same time, and does as much work as eight stamps in a day, crushing either wet or dry.

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## TREATMENT OF AURIFEROUS MINERALS—THE QUICKSILVER-WAVE AMALGAMATOR.

The great discrepancy between the value of an auriferous mineral as shown by assay, and the value of the gold actually extracted in the ordinary process of treatment on the working scale has been the source of constant annoyance and disappointment to shareholders, though mining engineers and inventors have laboured assiduously to devise methods of effecting a complete separation of the precious metal from the matrix containing it. Perfection in commercial processes is not to be expected, but it is not impracticable to make a system so nearly perfect that there shall be no appreciable loss of marketable product, and that the working cost shall be reduced to the minimum. Gold mining when carried on as a commercial business must be conducted on a different system from that of the mere scientist, whose mind would probably be dissatisfied with anything short of the extraction of the whole of the gold contained in the ore even if it involved a loss. But the practical miner in exploiting an auriferous vein must consider and decide whether he will aim at the extraction of all the gold that will yield a moderate profit upon his capital outlay, or at the extraction of that which will yield the greatest pecuniary result in the shortest time. Where mines are limited in extent the first course is obviously the more business-like, but miners being, more than most men, in haste to be rich, the second course is that generally adopted, the result being that the mine is more rapidly worked out, though much of the contained value is lost in the treatment of the ores.

But the question is whether the advantages of both systems—the large returns of the one and the quick returns of the other—cannot be secured simultaneously. It is plain that whoever should design an amalgamator treating ore economically and rapidly, yet capable of saving float gold, and also of rendering rusty and refractory ores amenable to quicksilver—combining speed, exhaustive extraction, and low rate of expenditure—would do great service to himself, to miners everywhere, and to the world at large. This the Quicksilver-Wave Amalgamator Company claims has been done by the inventor of the patent amalgamator shown in the annexed diagram—Mr. Henry Moon—and the results of the working of that machine, which have already been recorded in the *Mining Journal*, go far to substantiate the claims put forth.

By way of description of the amalgamator it should be stated that the machine has a simple and easy swinging motion of 3 in., backwards and forwards, which creates an intermittent wave of quicksilver and water, into which the pulp from wet crushing battery (or other wet pulverising machines) is fed. A new surface of quicksilver is thus constantly being presented to the pulp. It will be observed that the incline of the bottom, instead of being towards the discharge end, is the reverse, so that the free action of the pulp, quicksilver and water, is generally of sufficient duration to brighten by attrition the small particles of rusty gold; while the tendency of the lighter particles to be drawn into or around the wave of quicksilver, caused by the drawback of the wave, enables the finest gold to be saved. Inside the machine, running parallel with and as near as may be convenient to the inclined bottom, is placed a series of scrapers or rakes; by this means the heaviest ores are prevented from packing, and assistance is rendered to the water in carrying off the tailings.

To work the machine, care must be taken to level the bed plates, which are made of wood. About 60 lbs. of quicksilver is placed in the first circular back nearest the feed end, and a similar quantity can be placed in the second circular back if it is desired to amalgamate the tailings. So long as the quicksilver is not too heavily charged with gold, and provided the pulp is regularly supplied, the process is carried on without attention. The speed of the amalgamator is kept at about 70 strokes per minute. But little power (from 1 to 1-horse power) is required, and as regards capacity, one machine, smallest size, under ordinary conditions is good for a five-stamp battery, equal to (say) 10 tons per 24 hours. This size is recommended on account of convenience of transportation; they can be made of three sizes, however, to treat 10, 15, or 20 tons per 24 hours. These amalgamators can be readily placed in position,

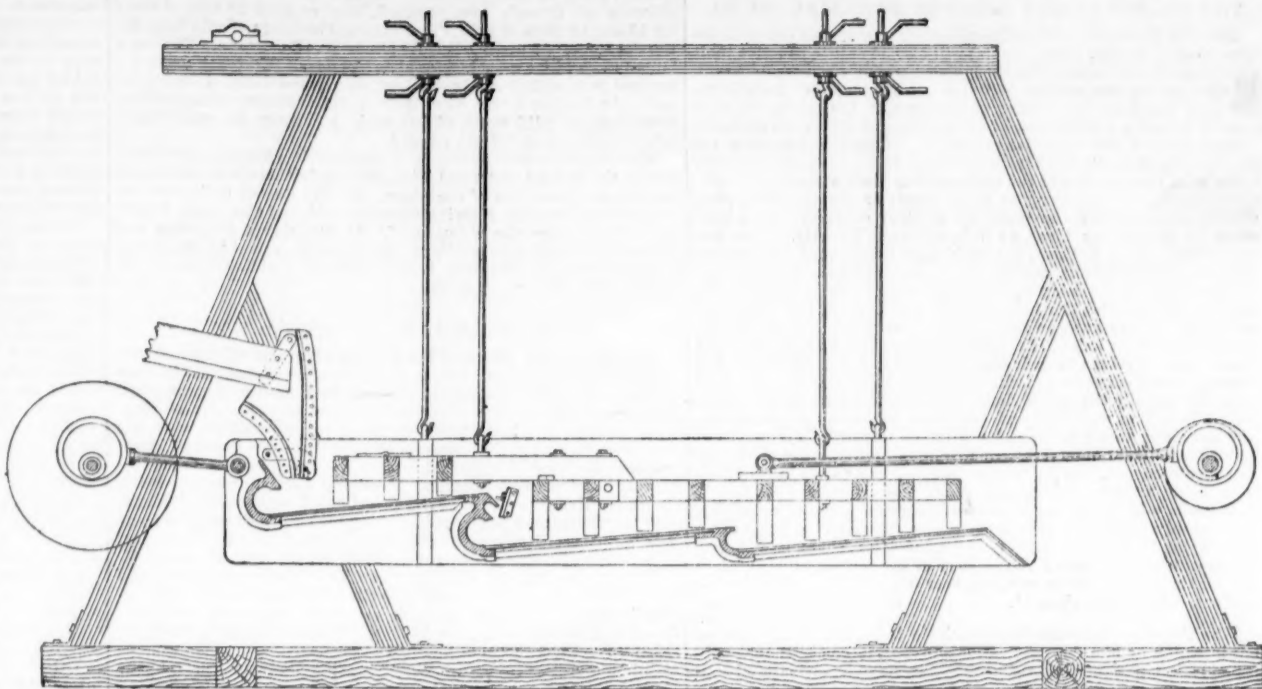
and be ready to work within a few hours after their arrival at the mine; they will run in conjunction with any existing machinery, and an ordinary mechanic can put them up.

The extent of the loss which takes place in the treatment of auriferous ores would be altogether incredible were it not so clearly affirmed by all the most competent authorities on the subject. Thus, Prof. Eggleston, of the Columbia College School of Mines, New York, one of the best known mining scientists in the United States, refers to a case where three miles below the mills the average of 12 assays showed the water to be worth nearly 1d. per gallon for the gold it contained, so that the water passing that point daily contained about 70l. worth of gold, much of which ought to have been caught to increase the shareholders' profits. He says: "These losses are greater than is usually supposed, because as a general rule systematic assays of the tailings are not made. Yet it is known that the tailings contain precious metals, and they are sometimes reworked with profit, especially those from the silver mines. An interesting investigation was made some years ago, the results of which are given below, showing the great loss in some of the mills. It was found that water from the mill's three-fourths of a mile below them contained in suspension, as an average of 12 assays, \$0.018 (nearly 1d.) per gallon. There were in this locality 516,000 gallons of this water flowing away in 24 hours, or a loss of 68l. of gold. It was estimated that the annual loss of two mills working 250 days in the year was 17,000l. From these and similar data the conclusion is drawn that the loss (including that in the tailings) is between 50 and 60 per cent. of the total yield of the ore." In Grass Valley, California, the loss of gold by mill process is stated in Dr. Raymond's official report to have been at the best mills 40 per cent. of the yield, of which the float loss was nearly 14 per cent. And in Australia the average of 18 months daily assays, during which time over 85,000 tons were milled, the loss also reached 40 per cent., so that the general estimate that has been arrived at is that, taking the mills all round, not more than one-half of the gold contained in the ore figures in the returns.

Yet these heavy losses are by no means necessary, since the cause of them is understood and remedies have been suggested. All that seems requisite is more intelligent mechanical arrangements. In nearly every mining camp, says a well-known American mining engineer—Mr. Bridgman—we "find ores of too low grade, or containing too un-

favourable constituents, to admit of advantageous manipulation on the means ordinarily employed. Oftentimes the quantity of the ores greatly exceeds that of the better classes, and then the demand is heard for cheaper processes, and men invest recklessly in all sorts of new and untried apparatus and methods. Every mining man knows that it is not to possible future metallurgical revolutions, nor to new *ne plus ultra* processes, we must look for our cheapened production, but rather to improvements in the known and tried processes we already have, and to a more intelligent application of them." Now, of the several sources of loss the imperfect contact of the gold with the quicksilver appears to be among the most important for Prof. Eggleston, referring specially to this subject, says that gold and silver "will go much quicker to amalgam than to mercury. Too slow a current of water keeps the surface of the plates covered with a film of sand; a too rapid current will prevent the gold being caught. If the gold is attached to a piece of the gangue rock which is relatively large, the specific gravity may be so reduced as to prevent the particles from coming in contact with the mercury. If the blankets are left too long without washing, so that the hairs become charged, the fine particles of gold are left. If all these causes of loss are avoided there are still others, for if the mercury is not kept clean, or made so by chemicals, the "quick," having an extremely thin film upon it, does not act upon the gold or silver. Exactly the same effect is produced to a small extent when the rock is soapy, as is the case with the magnesian and aluminous rocks. It is not necessary to agree or disagree with these various authorities as to the causes of these losses in gold mining. Enough to say that all authorities, and they might be quoted to endless length, agree that such losses constantly occur under the system of gold mining which has heretofore prevailed."

It is claimed that the Quicksilver-Wave Amalgamator enables the whole paraphernalia of concentrators, blanket sluices, coarse canvas sluices, riffle sluices, and Cornish buddles to be dispensed with, so that the difference of first cost alone must be considerable, and as trial workings in London have shown that the amalgamator is capable of catching more than 90 per cent., instead of only 50 per cent. of the gold as proved by assay the difference of efficiency would suffice to enable many mines, which have hitherto been worked at a loss to yield abundant profits.



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## Original Correspondence.

## THE GOLDEN QUARTZ REEFS OF AUSTRALIA—No. III.

SIR,—In giving the information about our quartz reefs I do so in the hope that other men (gold miners) will also be enlisted to give their experience of auriferous veins though your widely-circulated Journal. By thus aiding one another with our varied practical knowledge, gathered together from different quarters of the globe, we shall quickly collect a vast amount of useful information for the guidance of each other in our respective countries. I hope if any persons take up this subject in the same spirit that they will not occupy too much space with theories, but in the main confine their attention to well-chosen facts, and indicating to what theory or theories they lean, so that we may know the tendency of their observations. I have already published my ideas on this subject sufficiently. I am not absolutely wedded to them, but seek some better ones or more corroboration of them from any and every good source. I think it a grave reflection on mining men that after so many centuries have elapsed during which this industry has been in existence we miners of the present day know so little of the laws which govern the existence of veins or lodes. If we can get together a number of simple descriptions of veins and their enclosing strata, and other information relating thereto directly or indirectly given systematically, we shall approach steadily the much desired end above mentioned. I hope miners as well as managers and engineers will take up this subject, and especially young miners, for what is particularly required is trained intelligent observers. In this investigation every miner can and should engage, and he will find it will add a charm to his otherwise gloomy vocation, and give him an interest in his work that it does not in other respects possess. In foreign countries or not mining is commonly conducted away from towns possessing pleasant occupations for spare time, and young miners, &c., could find endless enjoyment in the study of the geology of the district in which their lots for the time might be cast, together with the study of vein formations.—*Melbourne, June 11.*

WM. NICHOLAS, F.G.S.,

Consulting Mining Engineer.

[The above are extracts from a private letter from Mr. Nicholas, not intended by him for publication—in fact, it enclosed that published in last week's *Mining Journal*—but the observations and suggestions appear so valuable that we have taken the liberty of printing them.—*Ed. M.J.*]

## GOLD MINING—NEW SOUTH WALES.

SIR,—In a former letter I made reference to the Brown's Creek Gold Mine, near Blayney, in this colony; and as there has just been published an official report on it I now enclose it, as not merely supplementary but greatly enlarging my meagre description of it. Mr. W. H. J. Slee, the Government Inspector of Mines (May 6) says:—I have inspected the Brown's Creek Gold Mining Company's Mine, which is situated about 6 miles from Blayney. The main shaft is now 150 ft. in depth; the lode or dyke consists of clay, quartzite, limestone, flint, and other matter from 20 to 90 ft. in width, the whole of which is put through the crushing machine. About 3 dwts. per ton pays all expenses, of which the timber used in the mine forms the principal item, every 4 ft. set of timber costing about 5s. The mine is worked on the block system; the timber in the ground worked out is cut away, and the worked out ground allowed to drop. Everything in and about the mine is in fair condition, and creditable to the management. The company have now three large boilers, a 50, 12, and 8 horse power engines, and 50 heads of stamps. Six batteries or 30 stamps are 500 cwt. each, and four batteries or 20 stamps are 800 cwt. each: 40 stamps are now at work night and day, and the remaining 10 stamps will be started at an early date. There is also at work a plunger, a Tangye pump, and a draw lift. The crushing stuff is raised in cages, by which the pressures employed in the mine also ascend and descend. Everything possible is done by Capt. John Smith and John Carry, mining and underground managers, to prevent accidents. The company numbers about 80 men in and about the mine and machinery, exclusive of wood and coal carters. The blanketing tables at the battery are 40 ft. in length. Each table for each battery has six of Roberts's electric copper plates, and there are four of Roberts's and Denny's grinders and amalgamators to treat the blanketing. Mr. William Roberts is the general manager of the machinery and mine. The road from Blayney to the mine for about 3 to 4 miles is in a very bad state, and in parts very dangerous to those who are compelled to travel on it.

Some years ago I was on a visit to Cooper's freehold farm, on the other side of the creek, and Mr. Cooper pulling up a maize plant half grown, and turning the roots, with the rich loamy earth adhering to them, between me and the sunlight, said "See the gold in it, Sir?" and certainly there it really was—only a few small specks, very light and fine, but undoubtedly the real metal itself, too scattered through the field and too light to save to pay for working, but still evidencing the extent of the gold-bearing deposit; and which probably, if sunk on to a fairly reasonable depth, would develop into something worth while.

Respecting the operations at the Great Cobar Copper Mining Company's property, Capt. Dunstan (May 24) writes:—Underground: The diamond drill was started to work at the bottom of Barton's shaft on Thursday, May 15, and during the Thursday, Friday, and Saturday bored east 8 ft., and on Monday, the 19th, cut the eastern wall, proving the lode to extend 14 ft. east from side of shaft. The drill is now employed boring west, and is in 13 ft., proving the lode up to date 34 ft. wide, and western wall not yet out. The core brought out of the bores shows the lode to be of medium quality east of the shaft and for the first 9 ft. west, the remaining 4 ft. being richer in quality, the drill now boring through good ore. At the 54 the rise being put up to meet No. 6 winze has been put up 21 ft. 7 in., and this winze sunk 21 ft. 5 in. and holed, thus effecting communication for circulation of air in this part of the mine, and has also opened good ore ground for stopes. At the 26 a winze has been sunk below this level 15 ft., 290 ft. south from Barton's shaft. This winze is now down 41 ft. below the level, passing through a lode composed of carbonates, oxides, and grey ore: 1800 tons of ore have been raised from the different stopes at the 54, 39, 26, and 15. The stopes opening up at the 54 show immense bodies of sulphuretted ore, and there is an improvement in the quality of the grey ore and carbonates lode at the 26 and 15, north of Barton's shaft. All appliances throughout the underground workings are in good working order.—Smelting Works: 1510 tons of ore have been smelted, producing 200 tons of fine copper; 225 tons of fine copper have been made, and 226½ tons despatched. I have now 14 furnaces at work.—Open Air Calcining: The kiln of sulphuretted ore recently put together burnt splendidly, and I consider this mode of treatment a perfect success. For the week ending May 24 Capt. Dunstan wires having despatched 34 tons of fine copper; the output from ore smelted is equal to 60 tons of fine copper; 15 furnaces working; weather fine.

The manager of the Nyrnberg Copper Mining Company reports the output for the week ended May 24 to be 292 tons of ore smelted, producing equal to 50 tons of fine copper; 53 tons refined and 82 tons despatched.

The following is a return of tin ore received at Newcastle and Morpeth for the week ended May 17:—From Armidale to Morpeth, 7 tons 6 cwt.; Uralla to Newcastle, 26 tons 5 cwt. 2 qrs.; Uralla to Morpeth, 19 tons 1 cwt.; total, 52 tons 12 cwt. 2 qrs.

The subjoined is the latest telegraphic news to hand. A telegram from Albany says—A few months ago the Border City Gold Mining Company was formed to test the deep alluvial ground at the Black Range, where in former years very profitable returns were secured by a large number of miners, who, however, were compelled to abandon their operations on account of the large body of water which was met with as the working approached the deep ground. At the meeting of the directors it was reported that the shaft is now sunk and centred to the depth of 100 ft. It is expected to strike bottom in another 20 ft., and tenders have been accepted for the work. It was also announced that powerful machinery had been procured, including pumping, winding, and panning gear. The said plans, which weigh over 40 tons, is now lying at Wodonga, and will be brought over and erected forthwith.

At Mount McDonald, Gray and party, No. 2 tributaries on the Ballmoral line of reef, have finished crushing 19 tons of stone for a yield of 46 ozs. 13 dwts. of gold. Daniels, on Ponce's cancelled lease, crushed 3 tons of stone for 5 ozs. 8 dwts. of gold. McLeay and party, tributaries on Grant's Amalgamated, have crushed 27 tons of stone for 18 ozs. 18 dwts. of gold. The plates are looking splendid from the Eureka stone. At present it looks almost like 3-oz. stone. The party intend to continue crushing for about 10 days. Everyone seems interested in it, as it is the best defined vein on the field. All are jubilant. At Lucknow the New Reform Gold Mining Company has cleaned up for 221½ worth of free gold. At Temora the escort which left last week took 347 ozs. of gold.

With regard to gold mining in Queensland it is interesting to learn that in the Wilmot Extended Mine, at Gympie, there is splendid gold showing at the bottom of the winze. On the Russell reef there are 6 ft. of crushing stuff, showing first-rate gold, and also in the face of the north drive on the Wilmot reef. At Stanthorpe McQuaker and Salter have struck a splendid run of tin in the ground known as the Paddock Swamp. The wash is 3 ft. in depth, yielding 3 lbs. of tin to the dish.—*Sydney, May 28.*

R. D. A.

## WYNAAD GOLD FIELDS, 1875 AND 1884.

SIR,—I am well aware of the comparative ease with which one can become wise, either after an event, or after having paid in some way or another for experience. I admit, as a matter of course, that the surroundings of the majority of people only permits of such after wisdom, a minute minority alone being qualified with the possession of the requisite amount of experience, the depth of knowledge, or the honesty of purpose which are necessary to form even an approximately correct forecast. In mining matters especially is this the case. Every reader of your Journal has, I venture to think, met with that eminently practical Cornish proverb—"Where it is, there it is"—but very few people, especially when they think that there is a chance of making money, will admit anything of the sort.

My apology, Sir, for troubling you with these remarks is that I have lately had occasion to refer to the back numbers of your valuable Journal, and among many, to me, most interesting articles, I found one, published in the *Mining Journal* of Sept. 11, 1875, entitled "The Gold Fields of South-East Wynaad," and which consists mainly of extracts from Mr. Wm. King's preliminary report to the Madras Government, on what has since been the scene of so many unmitigated failures. It appears that the first notice taken of the occurrence of gold in the Malabar district was in 1793, by the then Governor of Bombay, who tried to get information respecting it, but it was not until 1831 that the Madras Government began actively to work. In that year Lieutenant W. Nicholson was deputed to explore the country, and although this gentleman is stated to have been but a poor geologist, his perseverance is described as marvellous. Nothing, however, came of his survey, except a fairly general condemnation of the low lying country as affording any scope for European energy. Coming down to more recent times (in 1844-5), Mr. Sterne having Australian experience, prospected the alluvial deposits, sinking at Dayavallah to the bed-rock. He, it is said, always found gold, but it was not sufficient in quantity to induce him to continue his work. Ten years later we arrive at the date of the Alpha Company's formation, the prospectus of which stated, on the authority of the manager and two of the directors, who have had much experience of quartz reef mining in Australia, that the quartz of the Skull reef would yield about 1 oz. of gold to the ton. How near these authorities have been to the truth I need not say. The meagre grounds for probable profit put forward in the final passages of Mr. King's report could only be interpreted as affording hope by a most imaginative mind, and as we have since learned, even they have proved too sanguine. At the present moment, when a certain clique are exerting themselves to the utmost to give a fictitious worth to their Indian gold shares, a calm consideration of the past history of the Wynaad gold field, as briefly set out above, supplemented by the actual proofs that have been obtained, particularly during the past five years, will not be without its value.

Had, Sir, the information furnished by you in 1875 received that attention which it merited, many people would have been saved a vast amount of gnawing anxiety, while several millions sterling would have been available for other, and in all probability more, remunerative investments.

MOONAD MANBALICODE.

## THE HOOVER HILL GOLD MINING COMPANY.

SIR,—Referring to the report from this unfortunate undertaking in your last issue, does it not strike the shareholders as somewhat extraordinary that Mr. Frecheville's *locum tenens* should, in his first monthly report, omit to state the number of tons of ore crushed? It is much to be hoped that we are not going back to the mystification that was practised by the original local management of this property. Another matter requiring the attention of the shareholders seems to me to be the cost of the London management. On looking carefully into this matter, I find that this has been, for 1881, 1365½. 16s. 2d.; for 1882, 1524½. 8s. 11d.; and for 1883, 1135½. 0s. 4d., making a total to Dec. 31 last of 4025½. 4s. 5d., or at the rate, within a small fraction, of 1342½. a-year. Pretty well this for a concern which probably never will return any dividend to the shareholders! This ought not to be allowed to continue. The following, in my humble judgment, should be the remedy:—1. Do away entirely with the London office as at present constituted. 2. Appoint Mr. Hopkins (the present Chairman) to be the sole director, Chairman, and secretary, under the title of general manager, at a remuneration of 500l. a-year, which should cover all expenses except legal ones. If such an arrangement were carried out, the office could be removed to Mr. Hopkins' own office at the West End. It would, of course, be necessary to alter the Articles of Association accordingly. On the other hand, if the company become prosperous, the board can be easily reconstructed. I enclose particulars (for your information only) of my holding in the company, to show that I am—

Westminster, July 28.

A SUBSTANTIAL SHAREHOLDER.

## CHONTALES MINING COMPANY.

SIR,—At the half-yearly meeting held last Friday I advocated the removal of Mr. White, and assign the following reasons:—Our having to pay Mr. B. Davies 1000l. for visiting and reporting upon the Chontales property. Mr. White was fully acquainted with all the surroundings and past workings; if he represented to the directors the best course to be pursued, and the directors did not act upon his advice, then he is exonerated, and blame and incapacity lies with them. As a consequence before Mr. Davies could make it convenient to start, and having to visit and report on other property previous to seeing ours, and the delay that took place before the report was received, and the operations commenced, the expenses of the home department going on as well as the expenses abroad entailed upon our financial resources some thousands of pounds, and the 20,000l. of new capital raised was almost exhausted before Mr. White made his first return.

That Mr. White should have sold pneumatic stamps and stores unless authorised so to do by the directors at the time he must have known that he was in close proximity to the rich nail, and which was intersected about a fortnight after selling stamps and stores, the stores in particular being to us of such great importance. In the letter in which he states that he has sold stamps and stores he has 5539 in hand, and letter of credit for 200l. equal to 10,000, and the money for stamps, stores, and use of dam, available when required. This was when writing at the end of the month. No importance is to be attached to what he quotes in the same letter—"I shall not use my last letter of credit; glad you had not advised me to sell the stamps." Without the last-named stamps we should not have been able to crush the ore that realised over 9000l. At the meeting I asked to see the correspondence of the directors to the manager. This was objected to. I was anxious to satisfy myself if the directors in communicating with Mr. White had given him authority to sell pneumatic stamps, stores, &c., at whatever depreciation as regards amount of cost of replacement rather than any monetary responsibility should be incurred by them.

The manner in which Mr. White worked the Consuelo Mine after

July, 1883, each month's report giving so many feet sunk below level. This was during the wet season, and so continued until we had sunk 35 ft. without any return, save in the month of November when he crushed 450 tons, at 49l. profit. To sink this 35 ft. in wet season the difficulties must have been great, and attended at a great expense. Although a large space of ground had to be broken to surface, the presumption is containing gold, being in close proximity to the rich nail, but no account has been given of a ton of ore having been treated in connection with the sinking of this 35 ft. until the last three months. In the last report he says "and I have already begun to open the western ground;" this is what he should have done, it being available some time before reaching the rich nail. Also during the rainy season of last year as a sequence our stamps, which are of such value and importance during the wet season, being entirely neglected, and our expenses at mine and at home going on.

I made some remarks as regards the manager's nephew, and salary of 200l. per annum, and was not satisfied with the opinion expressed by the Chairman as to his receiving that amount. Chairman, speaking of his being interviewed by the directors, they were amazingly pleased with him, or some phrase to that effect he mentioned that he had but one arm; and whilst I do not disparagingly of him on that account, in such a country as Wynaad we want to have parties whom we employ to be able to defend themselves if necessary. From what I understand of his duties, would be occasionally to be sent on matters of business for manager, and that he would have to keep the cash account, which would be a very small matter. A gentleman who has been manager of a gold mine in Australia, with whom I was in conversation, week previous to my going to the meeting, and to whom I also submit points in connection with the mines for his opinion, said reference to the cash account being isolated from society to him an evening it was a change.

We are now in close proximity to the San Antonio Mine, which formerly we obtained 20,000 tons of ore, averaging about 8 and 9 dwts. per ton, by means of a level driven; the rich ground of this mine has been intersected, and I feel certain that a large amount of payable ore will be available and continuous. Being near stamps the cost of transit will be trifling, and in the hands of an experienced manager we may expect important results.

The course to be pursued for securing an advancement of interests of the shareholders I would suggest that whilst we have money in hand before it is frittered away that an extraordinary meeting of the shareholders be convened with unity, each shareholder looking to his or her interest, it would be easy to accomplish an entire change in the management. What is necessary is that some of the large shareholders should identify themselves in movement, form a committee, issue circulars to each shareholder with proxies for signature for those unable to attend the meeting with a charge. I have every confidence that in one twelvemonth with our present prospects that we should have an opportunity receiving our first dividend instead of having to hear the unsatisfactory reports and statements we have had to hear from our respective Chairmen each annual and half-yearly meetings.

What I would suggest in selecting another manager is that should be paid a stated salary. Mr. White received the first 500l. of his engagement 500l. per annum. That in accordance with the amount of profits made a scale be framed by which the manager would be entitled to a certain amount of the profits, with 500l. a year. The manager, whether there is a dividend or not, is secured. We have proofs as regards managers entering upon their duties. The new broom sweeps clean. Mr. Smedley the first 10 months management gave a profit of 4217½, with less than 5 dwts. to the ton, and Mr. White, who entered upon his duties under circumstances very discouraging, yet for some time made profits.

The property is a *bona fide* good one, but the management is in confirmation of which I refer you to the statement made by J. Bell-Davies:—"If it is borne in mind that this percentage (more than 4½ dwts.) is taken from the gold actually extracted in the mine and not calculated from the actual value of samples, it results that a profit should have been made from the commencement of the undertaking."—*Bristol, July 30.*

WILLIAM BALL PALMER.

## HEALTH ON THE GOLD COAST.

SIR,—When Dr. Bourke's letter appeared in the *Mining Journal* March 29 I should have written to endorse it most cordially, but at the time confined to my bed by illness. I was astonished to read Mr. Dobson's letter, as he evidently possesses no medical knowledge whatever, whilst his two letters contradict each other. Dr. Bourke resided and practised in the Tacquah district for upwards of 15 years, he being the only medical man whose experience of the locality extends over so long a period, and during that time Dr. Bourke's skill and zeal in his profession and his devotion to patients were well known and recognised. My testimony to the effect is perfectly disinterested, as, unfortunately, Dr. Bourke and myself had personal differences; but none the less I wish to pay honour where honour is due, and desire most heartily to do so, to concur in what he has written.

Mr. Dobson's residence and experience extend over a very long time, mine date from April, 1851, when I first landed at the Coast, and since which time my residence on various parts of the West Coast—the Gold Coast included—has been almost without a break. I do not hesitate to repeat what I have often stated before, that though the climate of West Africa is very far from good it is nearly so black as it is painted, and many persons seek to exaggerate its terrors for their own ends, as was recently pointed out by Rose Price, Chairman of the Cankim Bamoo Gold Mines. Desires occasioned by lack of ordinary care and precaution, and by excess of various kinds, are often attributed to "climate."

All persons proceeding to the West Coast, and more especially the Gold Coast, should procure an excellent little brochure, "West African Hygiene," by Dr. C. S. Grant, of the Colonial Medical Service, published by Stanford, Charing Cross, and all African mining companies should supply two or three copies of it to their staff.

Earl's Court, July 29.

R. B. W. WALKER, F.R.G.S.

## CARN CAMBORNE AND CARNARVONSHIRE GREAT CONSOLS.

SIR,—How far Mr. J. S. Moody was justified in writing—and publishing in the *Mining Journal*—his letter of last week our legal advisers must determine. Suffice it to say, that his statements and quotations from our letters are garbled. He bought his shares of us at the price stated, and called once to see us. If it is a "suspicious" circumstance for men of business to be engaged and unable to see a person who may happen to call upon them, we fear thousands of City men must be guilty of the suspicion. We think it will be sufficient for us to state that the Carn Camborne shares which Mr. Moody bought of us at 1½ he could have sold over and over again at a profit of from 50 to 60 per cent., the shares having been dealt in at the Stock Exchange at 2½ each, and we can prove that we have bought thousands of shares at prices ranging from 17s. 6d. to 35s.

With regard to Carnvorshire Great Consols we are not responsible for the depreciation in the value of lead, the *Mining Journal* was by week for the last 18 months shows the state of both the lead and mine share markets. The best lead mine shares are almost a dime in the market at a depreciation of from 80 to 300 per cent. in value. The reports we published respecting the mines referred to were ours, but those of the managers of the mines, and were published week by week in the *Mining Journal*. Nothing could have been more promising for making valuable deposits of ore in depth than the lode in the 95 at Carn Camborne six months ago. It was a gigantic lode, 24 ft. wide, and the agents were confident that when met with in the 105 it would prove rich and profitable. Against calculation, however, it dipped away south, and as the reports about a cross-cut is being put out to intersect it, where we hope and believe it will be found shortly, and resume its size and character. We are responsible for these mineralogical vagaries? Had the lode been as rich as expected Mr. Moody would have gladly pocketed the dividends, and a good profit on his shares. He is one of a class who speculate to win, and become cantankerous when they lose.

We still contend that had Carn Camborne shares not been quoted by advertising dealers, who rarely, if ever, had shares for sale, the price would have been much higher even now, notwithstanding the temporary unfavourable appearance of the mine. The 1000 shares were offered to the shareholders of Carn Camborne was not in consequence of a fictitious application as Mr. Moody insinuates—the shares were not taken by the shareholders but allotted to, and paid for by the applicant, as can be proved if necessary.

The list of shareholders applied for by a solicitor was prepared as soon as possible, and the fact that the magistrate imposed no fine is proof that he saw through the object of the applicant, and that the company were not in default. The large holder took his profit when he judged that an attempt was being made to depreciate the value of his shares, and Mr. Moody should have done the same months before. In conclusion, we take this opportunity of stating, for the benefit of shareholders in Carn Camborne, that numerous instances have come to our knowledge wherein these shares have been bought from holders at a few shillings by dealers, and resold at double, and, in some cases, at treble the price for which they were obtained, by means of fictitious quotations, whilst, on the other hand, shares that were "beared" by dealers at about 17s. had eventually to be bought in against them at over double that price when the delivery could be no longer postponed.

ENDREAN AND COMPANY.  
Gracechurch-street, July 30.

If the quotations given in the *Mining Journal* were too high, the reply is, that they were inserted on the authority of Messrs. Endean.

#### ROMAN GRAVELS MINING COMPANY.

SIR.—The attention of the board of directors has been drawn to a letter in last week's *Mining Journal* signed "Miner," in which it is stated that several of the miners at Roman Gravels are owed 20% each, and are not certain of ever having it. This statement is a falsehood, and I am surprised that you should insert anonymous letters of this nature in your *Journal* without first informing yourself as to the correctness thereof. Be good enough to give the same prominence to this, in your next issue, as you did to that of "Miner."

London, July 30. TUNELL SOUTHGATE, Chairman.

[Our correspondent signing "Miner" has supplied reports to the *Mining Journal* on the Shropshire mines for the last 10 years at least, and his accuracy has not before been disputed, so that we were fully justified in inserting his letter.—ED. M. J.]

#### SHROPSHIRE LEAD MINES.

SIR.—We have often heard it said that it is a long lane that has no turning, and so we trust we are come to the turning, and have turned in the lane of prices for lead, down which we have been going for the last few years. We heard a gentleman firmly assert one day this week that there is no chance whatever of a substantial or permanent rise in the lead market without a war or a protective duty; and that a certain Spanish gentleman whom he named said he can supply us with lead or can send lead into England at 4l. 10s. per ton.

We should like to have some reliable information in a condensed form respecting these Spanish mines, for if it is true that sufficient lead can be raised from them, and at a small cost to supply the world, why the sooner the better we turn our attention from lead mining here.

#### [CORRECTION.]

SIR.—We made a serious error in the last paragraph of our communication last week. It should have read as follows:—"We hear a bad account from the South Roman Gravels and the Roman Gravels Boundary Mines. That several of the miners are owed 20% and upwards each," &c.; not Roman Gravels, as then stated. We are sorry the mistake was made, for we have known nothing of the Roman Gravels Company but what has been perfectly honourable, and trust they will be satisfied with this correction, which we hasten to send.

MINER.

#### MINERS' SAFETY-LAMP COMPETITION.

SIR.—I see by last week's *Mining Journal* that the 500l. offered by Mr. Lever for a good safety-lamp reverts to him, as the adjudicators are of opinion that there is not a lamp that fully answers the conditions stated. I am somewhat surprised that they should consider the Marsaut lamp equal to the Morgan lamp.

For the information of the miners I beg to say that I have seen these lamps tested with the same apparatus and under precisely the same conditions, with the result that the Marsaut exploded in a few seconds, and the Morgan lamp held its own in every respect, although submitted to the same ordeal for over 20 minutes. I feel that it is only my duty to inform you of this fact, as I saw it myself, and it is absolutely essential that the colliers should be supplied with the safest and best lamp, one on which they can safely trust their lives, one that will take care of the miners, not one that the miners have to take care of. Therefore, I should wish that all those whose lives depend upon a safety-lamp would see these two lamps, or any other now before the public, tested together, and form their own opinion according to results.

I trust you will favour me by inserting these few lines in the *Journal*, as this question is one of vital importance, not only to the 800,000 men and boys employed in our collieries, but to their relations, who, in many cases, are depending upon them for subsistence.

Manor Park, July 30. JOHN TODD.

#### FOREIGN MINING AND METALLURGY.

The condition of the French Iron Trade is far from brilliant. Notwithstanding that the rolling-mills in the Nancy and Longwy basins have reduced their production of late, stocks have been increasing to such a serious extent that a further curtailment of 15 per cent. in the output is beginning to be talked of, with the view of maintaining quotations. It is even feared that this fresh restriction of the production will be found insufficient. At Paris, merchants' iron has been quoted of late at 6l. 8s. per ton; this quotation does not appear to be regarded with much confidence. Some important orders for steel rails have at the same time been reported in France. Thus the Steelworks Company of France have just taken a contract for 12,000 tons from the Northern of France Railway Company, at 5l. 16s. per ton. The Southern of France Railway Company has also let a contract to the Bouran Rolling-mills for 50,000 tons, at 6l. 8s. per ton; the Bouran Rolling-mills, it should be added, are associated with the Marine Steelworks Company. Another contract for 100,000 tons is talked of, but nothing definite has transpired respecting it. The German iron trade has remained quiet; a slight improvement has, however, been noted in Silesia.

The Belgian Iron Trade has remained in much the same state, and all efforts to secure higher prices have thus far resulted in failure. English pig has continued to make 2l. 2s. 6d. per ton upon the Belgian markets; in the Luxembourg pig has brought 2l. 14s. per ton. As regards refining pig Athus has its production engaged until September, and has maintained a quotation of about 1l. 15s. per ton. In the Hainaut the current quotation for hard pig has been 2l. per ton; for ordinary pig, 1l. 16s. per ton; and for mixed pig, 1l. 12s. per ton. As regards iron, the current price for exportation has been 4l. 10s. per ton, while in small transactions on home account 4l. 12s. has been paid. No. 2 has not been carried beyond 4l. 16s. per ton; No. 3 has continued to be fixed at 5l. 2s. per ton. Girders have made 4l. 16s. to 5l. per ton. The demand for plates has rather fallen off, and No. 2 have maintained with difficulty a quotation of 6l. 4s. per ton. No. 3 have made 7l. per ton, and plates of commerce 8l. 12s. per ton. The Acoz Forges Company has announced a meeting for Aug. 5. We learn that some increase of activity has been noticed in most descriptions of iron upon the Austro-Hungarian markets.

The Belgian Coal Trade presents the tone usually observable in it at this period of the year. The situation does not, however, appear to be any worse than usual. In July orders generally fall off, while stocks accumulate at the pit's mouth. It cannot be said, however, that stocks are now larger than they are in ordinary years; and, but for the depressed condition of metallurgical industry, there would be little or no cause of complaint. An adjudication for 312,000 tons

of coal, required for the Belgian State Railways, will take place Aug. 6. The number of trucks carrying coal and coke which passed over the Belgian State lines in the week ending July 21 this year was 16,326, as compared with 16,478 in the corresponding week of 1883. The German coal trade remains in much the same state, and there does not appear to be much prospect of a change at present. Coking coal and coke has been greatly neglected; on the other hand, there has been a pretty good demand for gas coal. There has been a slight falling off in the movement of coal over the lines accommodating the basin of the Ruhr. The daily average quantity forwarded in the first half of July was 73,640 tons, as compared with a daily average of 78,140 tons in the preceding fortnight. The extraction of coal in the Saarbrück district in June was 444,527 tons, as compared with 453,853 tons in June, 1883.

#### REPORT FROM CORNWALL.

July 31.—There is certainly now a marked improvement in the actual condition of the share market, quite independent of its prospects, which at the very least are no worse. To a considerable extent, indeed, this improvement has been produced by the dealings in a comparatively few mines, such as Dolcoath, East Pool, Wheal Agar, and Tincroft (which is looked upon rightly with increasing favour); but it has its general characteristics likewise, and the fact that this upward tendency is shown during the height of the holiday season is a matter of increased congratulation, and bodes well for the future. West Kitty continues its forward career, and bids fair to restore the ancient glories of its once famous district. A 12s. dividend is more than satisfactory—it is promising.

We hear a good account of the prospects of the forthcoming exhibition of the Royal Cornwall Polytechnic, which opens this year somewhat earlier than usual. For this, we presume, Canada is responsible, and the doings of the British Association there. A special feature, prompted by the occurrence of the Murdoch centenary, is a display of apparatus for gas heating and lighting, but every department is believed, will be well filled.

The Devonshire Association for the Advancement of Science, Literature, and Art is this week holding its annual meeting at Newton Abbot, under the presidency of the Rev. T. R. R. Stebbing, whose address was a learned exposition of the doctrine of evolution in its fullest form. Considering that Newton is the metropolis of the Devonshire pottery district, there has been a singular absence of papers of such a practical or scientific character as would have an interest for the readers of the *Mining Journal*.

Another attempt is to be made to deal with the "mixed ores" of Cornwall, chiefly, of course, of the low grade class. Hitherto, efforts of the kind, though meeting with a fair amount of success, have, from a variety of causes, not been attended with commercial prosperity. Without discussing the failures of the past, however, we will simply point to the promise of the future, which is doubly good from the facts—first, that the Cornwall Mixed Ore and Chemical Company, which Mr. J. H. Collins, F.G.S., and Mr. W. Argall are now establishing, will have only a moderate capital, 2000l.; and, second, that the management will be in the hands of Mr. Collins himself, who has had a large experience in the treatment of low class and mixed ores, and who, to the old combinations of "wet" and "dry" processes, has added others, which he has himself worked out. As arrangements have already been made for the purchase of large quantities of excellent materials for operation—indeed, there is no lack of them—and for the acquisition of a capital site well supplied with water-power, there is no doubt that the new venture will be thoroughly equipped to make a full and final test of the problem. The minerals existing in these low grade and mixed ores include copper, tin, lead, zinc, arsenic, nickel, cobalt, tungsten, uranium, with considerable quantities of silver and traces of gold; and Mr. Collins holds it as proven that he can extract successively and with profit several or all of these metals, and can convert them into readily saleable products. This new venture is fraught, therefore, with important results, not only for the investors, but for the county.

The Geologists' Association brought their visit to a close on Saturday with a visit to the gigantic clayworks at Lee Moor, over which the members were kindly shown by Mr. W. L. Martin, and which not merely by their magnitude but by the economy and simplicity of their operations (fully described elsewhere) excited their admiration and their wonder. The excursion has been so successful that it quite on the cards that ere very long a similar one may be arranged for Cornwall, when the Association will come into direct contact with mining and its conditions. As it is the only mine visited, and that but casually, in connection with Brent Tor was Wheal Friendship, the gigantic "burrows" of which presented a most striking spectacle, and yielded to the hammers of the party a number of capital specimens. At Lee Moor, however, the great clay pit afforded an admirable illustration not only of the occurrence of lodes, but of their disturbance by a cross-course of flookan, and thus enabled the visitors to understand at a glance phenomena which mere description hardly ever succeeds in making clear. These lodes, moreover, while they carry tin, do so in such small quantities that one is puzzled alike at the perseverance of the old streamers, who have worked over every inch of the ground, and the small returns that seem to have rewarded their toil. No doubt they did their work well, for the bed of the Plym, above Cadover Bridge, has been streamed again and again, and there is not a vestige of tinstone—as was remarked when it was searched for on the Thursday Shaugh and Sheepston were visited—to be seen there now, and the writer has hunted for hours in the old workings there with little better result.

#### REPORT FROM DERBYSHIRE AND YORKSHIRE.

July 31.—Business in the mining districts of Derbyshire has undergone but little change of late, and may be characterised as quiet all round. The iron trade has remained tolerably fair; but in a great measure this is due to the fact that a good many furnaces are still out of blast, so that the production and consumption are pretty evenly balanced. Indeed the quality of pig being sent away into other iron-making districts is far below what it used to be, whilst the competition has become keener. The consequence is that prices have reached a very low point indeed—sufficiently so as to leave no margin for profit. Fortunately, however, our makers are not altogether dependent upon the outside trade, for they are in a position to absorb a very large proportion of what they produce. In connection with some of the largest concerns there are extensive foundries and forges that have been fairly employed during the greater part of the year so far.

The Staveley Company is well known at home and abroad for its pipes, pillars, and cylinders, and consequently commands a fair business at nearly all times. The Sheepbridge Company, in addition to its foundry, has three rolling-mills. The Stanton Company turns out a very large quantity of pig, but also uses a considerable tonnage on the spot for foundry purposes. More to the south the Butterley Company, who have several furnaces in addition to their foundries, are the largest producers of rolled iron in the county, having eight rolling-mills and about 40 puddling furnaces. The Clay Cross Company have two furnaces in blast, and turning out a great deal of foundry material, are also able to consume most of the pig that is made. On the other hand Mr. G. Dawes, of the Derby Works, has had only one furnace out of four in blast of late, whilst the furnaces at Oakthorpe, and those belonging to Mr. Plevins, the West Hallam Coal and Iron Company, and the Wingerworth Iron Company (Limited), are also out of blast. The foundries connected with the leading firms and companies have been doing a steady business, especially in heavy castings.

Several of the leading collieries are dependent a good deal upon the London market, which has been particularly quiet for some time past. Most of the coal sent is for household purposes, and the season, of course, has been very much against this description of fuel. Prices, too, have gone down to a very low point, such, indeed, as cannot leave a profit, for even best Silkestone coal is delivered to the London consumers as low as 20s. per ton. Steam coal has gone off fairly, all things considered, the railway companies being still amongst the best customers, an average tonnage, at the same time, being required for the furnaces in blast. Only a moderate tonnage

finds its way to the Metropolis, where it realises less than the house coal. It is delivered to ordinary consumers at from 18s. to 19s. per ton, whilst contracts are taken as low as 17s., or rather less. Gas coal has continued dull, as the companies take little more than what they require for present use. An improvement in this direction, however, is now looked forward to, for, whilst the consumption for gas-making must necessarily increase, so also will the stocks become heavier. Engine coal has been in but moderate request, and no change has taken place as regards other descriptions of coal.

Several branches of the Sheffield trade continue quiet, and but few are what can be called anything like busy. The production of pig is below what it has been, as the only furnaces in blast near to the town are two of Brown's and one of Cooke's, whilst, of course, a large quantity, especially of hematite, has to be imported by the steelmakers. The mills continue to be fairly employed, but those only are busy who are engaged on armour-plates. The demand for other kinds of plates has not improved of late. There is, however, more doing in hoop-iron, orders having lately come from both India and Russia. Some of the toolmakers are fairly off for business, there being a fair output of mining material. A new hand machine for boring, known as the "Tiger drill," has been introduced at a few places, and is said to be a marked success. In Bessemer steel a moderate demand has ruled for both billets and ingots, but the rail trade has not materially improved; but there is a steady make of other kinds of railway material, including springs, crank-axes, tyres, and wheels. Steel wheels, in sections and otherwise, are now in the ascendant, for, despite their increased price, they are admittedly more economical than iron, and they are now most extensively used in a considerable number of coal mines in particular. Machinery for agricultural purposes has become quieter, seeing that the requirements of dealers have been supplied to the full extent. In sheep-shears the manufacturers are now kept well going, a good deal of the work being for exportation.

The cutlery houses are far from busy, and it is only a few that are able to keep their hands fully going, the demand being the best for the finest kinds of table, pen, and fancy pocket knives. The American trade has been particularly dull for some time past, and no change for the better is expected so long as the Presidential agitation continues. Some few orders, however, have reached for special qualities of plain steel, for in this we still excel all other countries. In edge tools, saws, and files, the business doing is still of a steady character. Some of the foundries are now better off than they were in the early part of the year, for in addition to the pipe trade, more is being done in ornamental stoves, palisades, and ordinary builders' castings. The engine-works, too, continue to be fairly employed, whilst the railway wagon builders are doing well both in building and repairing.

The Coal Trade of South Yorkshire is in about the same state as when alluded to in last report. Household qualities do not go off at all well, more especially as regards the Metropolis, and pit prices still range from 6s. to 8s. per ton, whilst smudge is sold as low as 1s. 6d. per ton. Steam coal has gone off tolerably well, as this should be the busy season for it; still there has been a considerable falling-off in the quantity sent to both Hull and Grimsby for exportation as compared with the corresponding period of last year. Not much was done at any of the collieries in the district during the early part of the week, owing to the annual demonstration held at Barnsley on Monday, and the loss of one day's pleasure from a miner's point of view generally leads to the loss of a second one to recover from the effects of the first.

#### REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

July 31.—Were all the pits at work instead of the chief of them being, as now, idle by reason of the strike, there would not be much more than half work for them it is calculated. This arises out of the excessive quietude in the demand for fuel for ironworks and other manufacturing purposes. As matters now stand there is a very fair amount of business on hand at the collieries that are working, alike in the Staffordshire district proper and on the Cannock Chase. Much less coal is, however, coming into the district from outside fields than would be the case were the iron trade busy. Prices do not materially improve, though some of the small masters are getting rather more. The demand for pig-iron does not increase in any department. Best iron is especially quiet. All-mines hot blast cannot in other than exceptional instances command more than about 55s. per ton, and hematites not more than 54s. 9d., delivered into this district from West Cumberland and South Wales. Native part-mine pigs are 42s. 6d., and cinder pigs 40s., down to 37s. 6d. The finished ironmakers do not report any revival, and prices are wretched. Common bars are 5l. 12s. 6d. to 6l., and medium bars 6l. 10s. Hoops are 6l. 5s. to 6l. 10s. Sheets, singles, 7l. to 7l. 10s., and doubles 7l. 10s. to 7l. 15s. The Staffordshire Steel and Ingot Iron Company are just now rolling good quality steel plates with some alacrity, in a mill which has a capacity of production of 500 tons a week.

The opposition evinced by the Brierley Hill ironworkers to the proposal of the ironmasters that the operatives should accept a reduction in wages, so that the North of England manufacturers might be more fairly competed with has received the support of the South Staffordshire and East Worcestershire Millmen's Association. This association has met and passed a resolution viewing with suspicion the proposed reduction, and pledging itself to resist any attempt to reduce wages below the present basis, "regarding the cry of northern competition as the old cry of wolf, wolf! when there is no wolf." This resolve shows a lamentable want of knowledge on the association's part. The clause relating to the northern competition is ridiculous, since it is well known by everyone in the trade that the North of England competition is undoubtedly severe. The Wages Board are summoned together for Tuesday next to hear the masters' claim. It is expected that it will be resolved to submit it to arbitration.

Now that the West Lancashire strike has collapsed there is less hope than was last week apparent among the men that the Staffordshire strike, which entered on its fifth week on Monday, will ultimately prove successful. No great increase of funds is expected from the promise made at the Manchester Conference of Miners' Delegates. The majority of the masters are still quite firm, and scarcely any visible effect is produced upon the staple trades of the district by the struggle. The men continue their mass meetings, at which resolutions to still "play on" are proposed and passed.

#### REPORT FROM LANCASHIRE.

July 31.—The Coal Trade of this district continues extremely quiet, and at the collieries in the neighbourhood of Manchester, which have been kept going about four days a week, considerable stocks of round coal are accumulating. In the West Lancashire district the temporary stoppage of work, owing to the wages dispute, has tended to check any increase of stocks, but it has had little or no effect in reducing those already held. Supplies of all descriptions of round coal are largely in excess of requirements, and the better qualities for house-fire purposes are very bad to sell. Common round coals except that there has been a rather better demand for shipment, still meet with only a slow sale, and bulky hangs in the market. Slack, owing to the small quantity of round coal now being screened, has a tendency to get rather scarce with prices slightly hardening. Generally, however, with this exception prices are quite as low as ever, and at the pit mouth average about as under:—Best Wigan Arley, 8s. 6d. to 9s.; seconds, 7s.; Pemberton Four-feet, 6s. 6d. to 7s.; common round coal, 5s. to 6s.; bargy, 4s. 9d. to 5s.; best slack, 4s. up to 4s. 6d. in some cases, and ordinary qualities, 3s. 6d. to 3s. 9d. per ton. Rather better prices have been ruling at the shipping ports on the Mersey, and about 7s. 6d. per ton has been got on tolerably large sales of Lancashire steam coal delivered at the High Level, Liverpool, on the Garston Docks.

The strike in the West Lancashire district is now altogether at an end. The attempt to carry on the struggle in detail by "boyotting" several of the large firms has proved a failure, and the men have had to acknowledge that they have not the means for carrying on a strike even when limited to one or two districts. The result is that they have resolved to return to work at the reduced rate of wages. This is the result that I have all along predicted, and the short struggle

has only served to show the weak position of the men. Now that they have resolved to resume work it is very questionable whether the pits will be kept on more than half time. Three days a week is being talked of, and it is very certain that a very considerable restriction of the output will be necessary during the remainder of the summer.

There is a growing belief in the Iron Trade of this district that prices have reached very near the bottom, but buyers also entertain an equally strong conviction that there is no immediate prospect of any upward movement, and generally only a very dull, heavy trade, at extremely low prices, is looked forward to for some time to come. In the pig-iron trade orders continue to be given out only from hand to mouth, at the lowest possible prices. Lancashire makers decline to come below 42s. to 42s. 6d., less 2½ for forge and foundry qualities, delivered equal to Manchester; but they are undersold by district brands, both Derbyshire and Lincolnshire iron being obtainable at 6d. to 1s. per ton under the prices quoted for local brands. Practically there is little or nothing doing in the hematite trade; 55s. less 2½ is about an average quoted price for good foundry brands delivered here, but to secure orders of any weight there are sellers who would take under this figure. In the manufactured iron trade the demand continues insufficient to keep works fully going, and there is a keen competition for orders at very low figures, 5l. 12s. 6d. being now the average basis on which buyers can place out orders for good qualities of bars delivered into this district.

In the Engineering Trades, although works generally are still kept tolerably well employed on orders in hand, a slackening off in the weight of new orders coming forward is reported, and prospects for the future are not very encouraging.

#### TRADE IN SOUTH WALES.

July 31.—Business is still very active at all the South Wales ports; but there is, on the whole, a little relaxation at Newport and Swansea. The amount sent away last week from Cardiff was 139,511 tons foreign and coastwise, with 1565 tons patent fuel; Newport, 31,965 tons foreign and 21,848 coastwise; Swansea, 18,243 tons foreign, and about 14,000 coastwise, with 8290 tons patent fuel. House coal is very quiet, but small steam coal and patent fuel are in good demand.

The drought, which had the effect of stopping the Dowlais Works for a time, having been followed by an abundant supply of rain, filling all the ponds, has enabled the men to resume work, and much improved matters at Merthyr.

The strike at the Llynvi Steelworks is at an end as far as the furnacemen are concerned, they having gone in at a reduction of 8 per cent.

The amount of iron sent away from Newport last week was 3522 tons, while Cardiff exported 2240 tons. Iron ore has been received at Newport from Bilbao to the extent of 3990 tons, with 2930 tons from other places. Cardiff received 11,479 tons from Bilbao, and 2130 tons from other places.

A new company, to be called the South Wales Smelting Company, has been formed for the purpose of acquiring the Landore Copper Works.

The adjudicators for the prize of 500l. offered by Mr. Ellis Lever for a new safety-lamp, after examining 108 lamps, none of which exactly fulfilled all the conditions, make special mention, as was stated in last week's *Mining Journal*, of the lamp invented by Mr. William Morgan, of Pontypridd.

#### TRADE OF THE TYNE AND WEAR.

July 31.—There is not much change to note in the general state of trade and commerce here, but there is a little increase in the demand for tonnage, and freights have also slightly improved. The coal, chemical, and most of the staple trades of the districts are in a fairly healthy state, but there is no appearance at present of a revival in the shipbuilding industry, and it appears now to be certain that the tonnage built in the present year will fall very far short of the tonnage turned out in 1882. The depressed state of this trade continues to have a most depressing effect in many other industries, more especially on the iron trade. The best steam coal continues to be freely disposed of, and the best works are kept regularly employed; second-class works are not so well off for orders. Gas coal continues steady; the shipments at Tyne Dock for the week were 91,000 tons. The house coal trade is in a fairly healthy condition on the Wear, the Hettons and other first-class works are fully employed. There is a good demand for bunker coal for steamers on these rivers at present, and sea-going steamers now take unscreened manufacturing coal, which can be had at Tyne Dock, and at other points at low prices. It is ascertained that with the exception of the Baltic coal stocks of all kinds are not held largely; a stronger demand may, therefore, be expected for most kinds of coal shortly.

Homeward freights from America, Black Sea, and Baltic, are improving, and if outward coal freights can be got up, steamers will have a chance of making dividends for their owners in the winter months. Great exertions have been made to reduce the cost of working steamers, and with some success. Insurances and many other charges have been reduced very materially, so that there really is some prospect at present of an improvement in this important business.

The case of Mr. Ford, owner of the Thornley Collieries, causes much commiseration. He has had no connection with collieries until lately. He had advanced a large sum of money, not much short of 100,000l., in mortgage on these works, and he was advised that it was a good security. But the previous owners failed in making the works successful, and Mr. Ford was obliged to take them over, and owing to the bad state of the trade since that time he has been obliged to close them, and, of course, there is a possibility that he may sustain a very serious loss. It is, however, still expected that the works will be purchased by a large firm engaged in the iron trade in this district.

The rating of machinery has long been a vexed question in this district, and it still occupies the attention of manufacturers and others. During the last week a preliminary conference of the Union Boards on the Tyne was held. It was then stated that the owners of extensive machinery on the whole of Tyneside and the Wear had united together to take a great test case if necessary to the House of Lords to ascertain whether machinery in its different departments is rateable or not. It appears to be agreed now that the question shall be settled in the higher courts.

One of the tasks to be undertaken by the Prince of Wales on his visit to the North in August is the opening of the Newcastle New Museum, which is a large handsome building recently erected near the Banas Bridge, the main entrance to the town from the north. The old Newcastle Museum in connection with the Literary and Philosophical Society is a very old institution, and both institutions have been extremely useful to the inhabitants of Newcastle and the district for a long term of years. In the old times there were no mining institutes or similar institutions for the encouragement of scientific or professional men of any class, and the old viewers and engineers resorted to these institutions for assistance in their enquiries, and also contributed to them papers, plans, fossils, geological specimens, &c. Mr. Buddie, one of the earliest eminent mining engineers on the Tyne, made valuable contributions to these institutions, and Mr. Nicholas Wood, Mr. T. J. Taylor, and many others did the same, while they also derived great advantage from the books and instruments they had access to in connection with these societies. There is no doubt that the great George Stephenson and his son derived great advantage from being members of these societies. In connection with the museum there is a very large collection of fossils and geological specimens, and also a collection of British birds, which is said to be the finest in existence. This section of birds is due to the labours of Mr. J. Hancock, of Newcastle, an eminent naturalist, the whole of them, with few exceptions, having been collected and mounted by him. The Northern Institute of Mining Engineers was founded in the year 1852, Mr. Nicholas Wood being the first President, and since that period many similar institutions have sprung up in various localities in this country.

At Middlesbrough, on Tuesday, the iron market was well attended, but the trade was in a very inanimate condition. The market was

flat and weak. The bulk of the makers still adhere to the late rate of 37s. for No. 3, but forge pig is weaker, and 35s. has been accepted for it. The comparative small shipments of pig metal have had an unfavourable effect; there is not likely to be any reduction in the stocks of pig metal this month. The deliveries of manufactured iron and steel have been very large, reaching a total for the week of 13,421 tons. Some large deliveries of steel have been made, chiefly for India and Australia. The returns in the iron trade for the two months ended June 30 show that the average net price of iron sold was 5l. 5s. 5d. There is a marked reduction in output, as well as lower prices since the return made for the two months previous. The return at the end of December last year showed that the average price for rails, plates, bars, and angles was 5l. 17s. 11d.; and, as above, on June 30, 5l. 5s. 5d.—a reduction of 12s. 6d. per ton. Only once before has such a low figure been reached as at present—in the three months ending August, 1879, when the price was 5l. 3s. 3d. The wages of the iron workers are also very low. The make in the two months ending October last was 117,365 tons, and in the two months ended June last it was 68,829 tons. The reduction, as might be expected, is mainly in shipbuilding iron.

#### REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

July 31.—About fifty members of the Chester Society of Natural Science, headed by their President—Prof. McKenny Hughes, of Cambridge—visited Llanberis and Snowdon last Thursday. The more adventurous followed Prof. Hughes to the summit of Snowdon, the professor giving illustrative descriptions of the geological structure of the mountain by the way. The party were joined by a detachment of the Menai Society of Natural Science. We want a more detailed account of the various beds—in ascending order—from the summit of the Cambrian group to the Bala or Caradoc beds forming the summit of Snowdon, more especially with reference to the metalliferous and slaty beds, not forgetting the fossils. Even the sections of the Government Geological Survey are too general in these particulars. Could not some ardent member of one of these societies supply the want?

I referred last week to the proverbial resumption of work at the slate quarries near Bettws Garmons. At one of these—Hafod-y-Wern—this has already taken place. About 50 men have been taken on. It is probable that this will be followed by the restarting of Garg Tawr Quarry. At the Glynrhonwy Quarry, Llanberis, the whole or the old stock—the accumulation of some years—has all been sold off. The Pen-y-bryn Quarry, situated at Nantlle, has been brought to a stand, through some unfortunate disagreement. The Goredale Quarry, near Portmadoc, is about to be worked for slabs and slates. This quarry, which has been next to idle for some years, has, perhaps, the best built machine-house in Wales. Explorations at the Clogwyn-y-Gwin Quarry reveal excellent slate in depth. Through alterations in the management of Plas-y-nant Quarry a number of men have been discharged this week. At Portmadoc 17 vessels arrived for slates last week, and 15 sailed.

The leadworks of Messrs. Walker, Parker, and Co., situated at Flint, Chester, and Liverpool, failed to realise a bid when put up at the London and City Mart, Tokenhouse-yard, last Wednesday. The stock in trade alone of these works has been valued by Sir James Picton at 95,000l. I have a vivid recollection of these works for half a century, during which they have been successfully carried on, and it is probable they will still be carried on by members of the same families. Passing by these and other works of the same kind last week I notice very large stocks of pig-lead stocked in the yards, but no doubt with the slightly increased demand for the metal these will soon be cleared off.

Misfortunes seldom come alone, and the fall of the chimney of the smelt works connected with Snailbeach Lead Mine, Shropshire, was not particularly wanted at the present time. So far these works and mines have not been stopped, and a very slight rise in the price of lead would obviate so direful a necessity.

The response to the request of the Great Holway directors for further subscriptions has not been very good, only 800l. But we hardly expected five or six years ago that such a request would be necessary. Our friends in Cardiganshire try to keep their hearts up, although it must be weary work for some of them this solitary wandering among the ruins of dead mines. The production of copper ore for 1883 shows a serious reduction as compared with that of 1882.

Among the colliers, the St. John's Ambulance Association is making way. Eighty-one members have been attending the classes held at the different collieries, and at an examination just held 79 of these have passed very satisfactorily. On Thursday those who belong to the Wynnast Colliery class were presented by Miss Thompson, the daughter of the manager, with certificates of competency. At the same time a vote of thanks was given to Dr. Lawton Roberts, who has been engaged in lecturing in connection with the movement among the colliers and their families.

The flooding of the Mostyn Colliery, on Monday week, was attended with fatal results. A number of valuable horses were lost, and an explosion occurring afterwards when a party of men were descending the shaft to regulate the pumps, blew one of them out and into the water, where he was drowned. The force of the explosion shook the ships alongside the quay. The receipts of the Cambrian Railway show a total increase for the half-year of 555l. A circular has, however, been issued to the shareholders stating that the directors, in the interests of all concerned, have assented to the appointment by the Court of Chancery of the board as managers and the secretary as receiver of the company's undertakings. They say the continued depression in trade has led to the adoption of this course, but hope that a revival in trade will lead to a more satisfactory result.

**FRENCH IRON MINES.**—From the statistics for 1882 just published it appears that during the 12 months 2,453,145 tons of ore were raised from the mines. The ironstone beds yielded, in addition, 1,014,106 tons, of which 326,578 were pure metal. The total weight of ore raised was thus 3,467,251 tons, representing 16,841,954 fr., or an average of 4 fr. 86 c. per ton. Compared with 1881 the production shows an increase of 435,181 tons, while the value of the ton all round shows an average decrease of 14 c. During the last few years there has been a steady increase in the production of iron in France. In 1873, when exceptional activity reigned in this department of industry, the production was 3,051,000 tons. The following year the total declined to 2,516,000 tons. In 1875 there was a further slight decrease, and the yield for a time varied but little. Since 1879, however, the tendency of production has been upward, and in 1882 the yield was the highest that has yet been attained. Not only has the production of the iron mines increased, but the number of ironstone beds in working has augmented from 185 to 216. The number of mines in yield has increased from 78 to 82. The number of men employed in the smelting and preparation of iron ore in France is now about 9400, some 4000 of whom work aboveground. The average cost of labour was 3s. 7d. per day for miners, and 2s. 9d. for men employed on the surface. A total of 9,500,000 fr. was disbursed in wages during the year.

**ELECTRIC TELEGRAPHY IN AUSTRALIA.**—The extent of electric telegraph wire in New South Wales in actual use during 1882 was 15,901 miles 47 chains 13 links; the number of stations was 345; the revenue for the year, 120,265l. 13s. 4d.; and the expenditure (exclusive of interest on cost of construction of lines), 142,534l. 13s. 6d. In 1883 the extent of electric telegraph wire in actual use was 17,272 miles 41 chains 35 links; the number of stations, 369; the revenue, 134,643l. 2s. 4d.; and the expenditure (exclusive of interest on cost of construction of lines), 163,328l. 16s. 11d.; 2,107,288 telegrams, of the value of 165,276l. 14s. 10d., were transmitted from the colony; and 2,102,044 telegrams, of the value of 159,095 2s. 1d., were issued in the colony. The New South Wales receipts on local and inter-colonial (exclusive of New Zealand) business were 122,891l. 0s. 7d.; on New Zealand business, 1898l. 15s. 1d.; and on international business, 3049l., making the total receipts 127,838l. 15s. 8d.

#### Meetings of Public Companies.

##### AUSTRALIAN MINING COMPANY.

The ordinary general meeting of shareholders was held at Guildhall Tavern, Gresham-street, on Monday, Mr. HENRY COLLIER in the chair.

Mr. U. P. HARRIS (the secretary) read the notice convening meeting, and the minutes of the preceding meeting. The reports and accounts were taken as read.

The CHAIRMAN said he would make one or two remarks with reference to the report, although he believed it contained all the information which the directors possessed. The shareholders had doubt observed that the amount received for rents this year was slightly in excess of the previous year's rents; and that, though the balance outstanding this time was less than last year. Considering the low price ruling for corn all over the world—corn being chief article grown by their tenants—he thought the rents received were satisfactory. He might mention that when this property was leased to tenants the leases were made to extend over periods of seven years, and in the first seven years the rentals were tolerably well paid, but in the following seven years the company had been unable to get increased rent they had stipulated for, and it became necessary to have action made. However, they had increased the rent roll from 23.0l. in the seven years to 2400l. in the next period, and this year it exceeded 2500l. The reason for this was that the property was increasing in value. Its value, of course, affected by various circumstances, such as the competition of lands, and attempts on the part of the Government to induce poor people to take land upon more and more advantageous terms; but still the fact remained that this company's property had increased in value, and he believed it to continue to do so. The Port Augusta land had been sold, and the accounts been satisfactorily closed. The explanation with regard to this property was that in the report would doubtless be intelligible to all the shareholders. If it were not he would be happy to explain it further. He might say that the past 20 years materials, land, and other things had been sold; but amounts received had never been worth distributing at the time. As a matter of propriety, however, the directors had not thought it right to keep back that was, in fact, capital destroyed, nor that it should be passed on as if income, so that they were enabled this year by only slightly diminishing revenue received last year to pay back everything in the shape of capital material at the time that mining operations ceased. They now started with a fairly clear sheet, showing exactly the right figures representing the right position. This large sum received for half an acre, of course, if simply set off the amount standing to the debit of the accounts would give a false impression, and it had, therefore, been necessary to treat it as it had been treated, and shareholders were no doubt as well pleased as the directors were at the fact that their agent had been selected for special distinction, and he would later on to pass a resolution on the subject. If there was any other matter which he had forgotten to touch upon he would be very glad to deal with the shareholders wished it. He then moved the adoption of the report, which was carried. Mr. WHITE asked whether there was anything in prospect which the directors could state to the shareholders with regard to a further return of the mine. Was there anything ripening?—Mr. F. COLLIER (the Deputy-Chairman) replied that the board confined themselves with stating not what would be in the future so much as what had happened in the past. The Chairman went as far in the direction of prophecy as could wisely be done. He told them that the rent-roll was continually increasing in a small degree. All mining operations were suspended, and they had not found any one willing on the most favourable terms the company might offer to take mining themselves. Nobody would be unwise enough to predict what would happen in the future. The directors had told the shareholders all they knew.

Mr. T. DAVIS did not anticipate anything more favourable in the future than the Charlton lease expires. Then they might hope for some better result with regard to the mining operations, if a lease had been accepted, was a company entitled to damages for a breach of contract?—Mr. COLLIER replied, saying there had been no contract. There had simply been negotiations on the matter, and these had fallen through. The motion was then put and carried unanimously.

Sir CHARLES WHETHAM, in reply to a SHAREHOLDER, said the deed of deed did not allow them to deal with the unclaimed dividends.

The CHAIRMAN moved the re-election of Mr. Frederick Collier as a director. Mr. WHITE seconded the motion, which was carried.

Mr. GEORGE PALMER proposed the re-election of Mr. Walter J. C. O. the other director retiring by rotation.—A SHAREHOLDER seconded the proposition, which was carried.

The auditors, Messrs. John Grove, Conrad Ehrensberger, and Thomas were severally re-elected.

The CHAIRMAN proposed that a cordial vote of thanks should be given to the company's agent in Australia—Sir Samuel Davenport—for his constant attention to the affairs of the company, and that he should be voted 100 guineas in recognition of the services he had rendered to the company in selling land at Port Augusta.—Mr. WHITE, in seconding the proposition, said that he was glad to observe from the extract which had been sent from the South Australian Register how their agent was valued in the colonies. It was exceedingly important to a company separated by so great a distance from the field of its operations to have an agent of judgment and above all, of integrity. They had reason to feel thoroughly comfortable in these respects, and the honour which had been conferred on Sir Samuel Davenport must be most gratifying to the shareholders, and especially to the directors.

The CHAIRMAN added that, as he need hardly say, the management of land out there required a great deal of tact, judgment, and patience, and he thought it politic, as well as just, to let Sir Samuel Davenport understand that they appreciated what he had done for the company. The proposition was adopted.

The meeting then closed with a cordial vote of thanks to the Chairman and directors.

##### NEW EMMA MINING COMPANY.

A special meeting of shareholders was held at the City Temple Hotel, on Wednesday, Mr. FREDERICK WILLIAM SNELL in the chair.

Mr. RICHARD L. HOBBS (the secretary) read the notice of the meeting.

The CHAIRMAN said: Gentlemen, the board regret very much the necessity which has caused them to issue the notice asking you to meet them here to consider the best course to adopt under the circumstances in which the company is now placed. You will all collect that we were in great hopes previous to March last of getting into fair water, and that we should without many more months of anxious waiting receive some intelligence from the other side that we had what we expected to cut—a bonanza of ore. From time to time reports from Mr. Gullins (in whom we have perfect confidence) saying that what we doubt mineral was there, and that with a little further sinking he would across the body of ore which he expected. Then came the unfortunate accident which damaged the boilers so tremendously, and put us to an expense of 2000l., or rather which damage has yet to be repaired. The funds at the time were nearly exhausted, and the directors had stated that they would be going on till June. This estimate would have been carried out, because it was quite sufficient. If this accident had not happened, but it became necessary for the board to consider as to what course they should take. Application was made to the shareholders to subscribe to a debenture loan of terms which the board thought were fair to offer at the time, but the board anxious not to swamp the shareholders by a heavy debenture loan at rates of interest, and, therefore, offering the debentures at 25 per cent. was, they thought, an inducement to cause all shareholders to come in and subscribe their proportion. If it was 5 or 10 per cent. simply, if all the shareholders had come in and taken the whole, it would have made their property good for the shares better, and they would thus have reaped an advantage. Unfortunately the amount then subscribed by the shareholders was only about 1500l., which was clearly insufficient to enable the directors to carry on the works of the company. Thereupon, the board again considered the matter, and determined to make a further offer to the shareholders, and offered them the debentures at 50 per cent., at 6 per cent. interest, which gave an actual interest of 12 per cent. on the debentures, the security being the mine and all the machinery, which has cost, I believe, between 8000l. and 9000l. It is in fact, except for the damage done to the boilers, which could be repaired at an expense of about 1500l. The last prospectus was then issued, inviting application for the debentures at 5l. for every 10l. debenture. Unfortunately the shareholders have not responded to that as we thought they would. The total amount we have had subscribed, by only some 50 shareholders, is 3390l. That brings us in about 2000l. Amongst that number the question will, no doubt, be asked, are the directors included? The directors are quite prepared to take their proportion of the debenture loan; and, in fact, they will take beyond it, and, before the meeting is ended, we can each say what we will do, and we will all do together. That being the case, it was pressed upon the directors that they should offer the debenture loan upon more advantageous terms, 50 per cent. I object to go below it, and if the shareholders do not come forward and help the company in the present emergency they deserve to lose their property, for I certainly do not care for going on with the company and adding with an enormous liability. I think that the loan at 50 per cent. discount should be secured. That being so, the directors thought it would be advisable to the shareholders together to see what, under the circumstances, was the best course to adopt, and I am very sorry so few are here to meet us. (The number increased in number as the proceedings went on.) We have had many letters from shareholders, and I am very much afraid that the former told the Emma Company when we issued a 10l. debenture for 1l., and for what they got 7l. in return, has caused them to look forward and hope that the company would adopt the same course, and issue a 10l. debenture for 1l. I think that has kept a great many people back. Having failed to get the loan at 25 per cent. discount, and having lowered it to 50 per cent., they think shall lower it still more. I have hope if the shareholders at this meeting express a strong opinion that the loan should not be offered at a lower discount than 50 per cent., the shareholders will come in; they only want to have the matter explained to them in order to induce them to subscribe. There are a large number of debenture holders in Scotland, very few of whom have subscribed, but I think an interview could be had with them we might get them to do so. Some gentlemen have lately been out to the mine, and they all come back with the same report—that in Salt Lake City, in New York, and in America generally the mine is expected to turn out a success, and the only regret is that it is being worked at the present time. There was a gentleman who went out

the last chance. He is a mining engineer—Mr. Henry Aitken—and is a considerable shareholder in this mine. We have a letter from him on July 16, 1884, in which he says: "I have just returned from the United States. I remained in Salt Lake City about three weeks, and saw Mr. Cullins almost daily, and had long talks with him about the Emma and other mines. I did not go to the Emma, as nothing could be seen, but I inspected several mines, one near the Emma. While I cannot say as to the Emma from personal inspection, I feel certain on two points:—First—Perfect confidence in Mr. Cullins as an honest man and a good miner; and (second) that if the Emma is worked it will give good results. I have been in London on Friday, Saturday, or Monday. If you or any of your directors would like to see me here or send letter to Great Northern Hotel, King's Cross, London, and I will be glad to call."—H. AITKEN.

P.S.—Another thing I am sure about, and that is if you sell you will likely get a very small figure, as the people there who wish to buy will band themselves together, so you will only have one offer.—H. A.

Mr. Aitken did call, and told me what I have heard over and over again—that the Emma mine, if worked, would eventually turn out a prize. There was also another gentleman (Mr. Robertson), a stock-broker in Edinburgh, who saw Mr. Cullins and Mr. Bennett, and came back with the same impression as every body else. He said he would give me the latest information. Mr. Greenup, my partner, was in Salt Lake City three weeks ago and only arrived in London yesterday. He saw Mr. Cullins and went with him to the mine. He saw the damage done by the snow-slide. He will tell you that the faith of Mr. Cullins in the mine is as great as ever, and that he is confident with a further expenditure of 4000s. or 5000s. that it will be brought into a paying state. That being so, the question for us to consider is, what are we to do? Is it your wish that we should offer more favourable terms to the shareholders, or should we attempt to raise the money for five years at 10 per cent. on the par value, which will give the company at 10 per cent. premium; that half the net profits should still be set aside for drawings at par, but that instead of paying them off at par they should be paid off at 10 per cent. premium. I do not know that I have anything more to say than this, that any amount subscribed goes absolutely to the working of the property. The expenses are cut down to the least possible amount, and the directors take no fees. I do not think you can have the business of the company conducted in a more economical manner than it is now. This is an informal meeting, and we do not propose to take any resolutions unless the shareholders wish to strengthen the hands of the directors by passing one.

Mr. BLADON said he was strongly of opinion that the terms of the board were sufficiently liberal, and should not be reduced. He pointed out at some length the advantages that would accrue to the shareholders from a cash subscription under this arrangement, and suggested that a personal appeal should be made to the leading shareholders.

The CHAIRMAN said, in reply to a question as to whether the debentures had been offered to the public, he objected to going before the public with a debenture scheme at 50 per cent. discount.

Mr. GREENUP, who has just returned from Salt Lake City, said he visited the Emma Mine, and saw the ruin which had been caused by the snow-slide. Mr. Cullins was with him, and explained that in order to make the workings safe it would be necessary to make an excavation under the spur of the hill, or otherwise the miners would not work, the place being very unsafe. Mr. Cullins said the indications were never more favourable than at the time when the slide occurred. From what he saw of Mr. Cullins he entertained a high opinion of him. He said he believed it would be only a short time after workings were resumed that the mine would be met with. Mr. Bennett said he would subscribe for 5000s. of the debentures.

The CHAIRMAN said the amount now subscribed was 3880s., and promises had since been received of 1000s., including the 5000s. from Mr. Bennett. The board would take 1500s., of which his own personal subscription was one-third—500s.

Mr. BLADON moved—"That this meeting approves of the issue of debentures upon the terms indicated by the Chairman, and requests the board to proceed to allotment as soon as 10,000s. has been received."—Mr. McEWAN seconded the motion, which was carried unanimously.

The CHAIRMAN said that those shareholders who did not subscribe to the debentures now would very much regret it hereafter.

On the motion of Mr. BLADON a vote of thanks to the Chairman closed the proceedings.

#### TACQUAH GOLD MINES COMPANY.

The ordinary general meeting of shareholders was held at the Guildhall Tavern, Gresham-street, on Monday, Capt. PRICE in the chair.

Mr. LEONARD C. HENRY (the secretary) read the notice convening the meeting. The report and accounts were taken as read.

The CHAIRMAN said he thought it would be better just to say a few words about their position and about matters generally. In the first place, as to the date of the meeting. The meeting was being held very much later than could have been wished. It would have been held much earlier in the year but that the action of Macdonald v. the company was pending, and they were anxious that the case should be decided in the Court of Appeal before the meeting; and, secondly, they had a heavy bill from the solicitors of the company which they thought it better to settle before the shareholders were called together. This bill had been settled on very advantageous terms. The solicitors had met them in a very friendly way, and had made a considerable reduction from their bill of costs. The shareholders would not doubt have noticed in the balance-sheet that there was a very large amount of calls unpaid in proportion of the capital. The greater portion of the arrears was due from the estate of the late Mr. Fitzgerald, the vendor to the company; but there was still a balance due to Mr. Fitzgerald's estate from the company for the balance of the purchase of the property, and the unpaid calls would be taken as to get-off against the debt of the company. This bill had been paid for the larger portion of the arrears; but there were calls due from other shareholders, which were gradually coming in. It was intended to get the balance in as quickly as possible, for it would be unfair to put the shareholders who had paid up their calls in a worse position than those who had not done so, and they would not only enforce the calls, but, except in special cases, interest would be charged at the rate of 10 per cent. from the date the calls became due.

With regard to the policy adopted since his colleagues and himself were elected to the board, notices had been sent to the shareholders telling them what had been done; but he would briefly recapitulate those statements. When they came into office they found that the capital in hand was insufficient to allow them to carry on the operations as they were then being carried on. They were employing a manager, a mining engineer, and 70 workmen, and the monthly expenses at the mine, besides the London expenses, were at least 2500s. They at once came to the conclusion that it would be impossible to continue operations upon such a scale for more than a month or two; and as they had no resources for purchase of machinery, and mining operations as then carried on were almost useless, they at once wrote and directed the manager, keeping on only the mining engine, to reduce the scale of operations. The result was that the mine workings were not got rid of was that the company was under agreement with a large number of the workmen until the following March, and as they had to be paid it was just as well that they should be kept employed. It was, therefore, necessary to have a man to direct their operations. At the same time there was a question of acquiring a bit of property in the neighbourhood which had been secured on very favourable terms, and it was necessary to have someone to report upon it and make samples, which only a mining engineer could do. Mining operations had been continued until the end of the week, and from this time the samples had been yielded about 1 oz. to the ton for the present. The operations had been suspended, and soon after the mine was struck the mining engineer was also dismissed. The directors had drawn no salaries; but at first they charged half-a-guinea an attendance, and recently they had drawn a guinea an attendance. The secretary, who had shown great zeal in the interests of the company, had consented to a reduction of his salary to 100s. a year, and as that included the rent and expenses of the office—except the stationary and so on—the shareholders would doubtless agree that the London expenses were not heavy. As to the present position of the directors, his colleagues and himself, he had found an unwillingness on the part of the shareholders to join the board, and the result was that Mr. Coleman and himself were the only members of the board. This was, of course, very unsatisfactory, because the real quorum of the board was three, and Mr. Coleman and himself therefore, did not constitute a quorum; they could only sign cheques and transact absolutely necessary business. They had invariably to be present when anything was to be done, at whatever inconvenience, and such a state of things might be dangerous to the company's interests. The Chairman then referred to a request on the part of the solicitors for some additional remuneration beyond the 10 guineas voted to them at the last meeting. The board, however, could only bring the matter before the shareholders and leave them to decide upon it. Their object in waiting as they were at the mine was to see what the results of other companies' operations might be. Favourable news had been received from some of them, and there was every probability that they would do well. If this should be the case, it was thought that this company would be able to place its unused capital of about 25,000s., and still make a good thing of the property. There was no doubt that the property contained gold in abundance, and the majority of engineers, miners, and other qualified people who had been resident on the property, united in saying that the wealth of the Tacquah mine was greater than that of any other of the properties on the Coast, having the most promising quartz, and possessing the greatest facilities for mining. The only reason why a more energetic course had not been adopted by the company was its want of capital. The Chairman then moved the adoption of the report and accounts.

Mr. SNOW, in seconding the motion, said he was convinced that the Chairman and his colleagues had done everything they could in the interests of the shareholders, and he felt that the success of this company was entirely dependent on the success of some of the other mines, for it would be futile to attempt to carry on operations with the small amount of cash they had in hand. He believed that by waiting until some of the other companies had obtained good results they might induce the general public to come in and find the necessary capital to enable them to carry on the affairs of this company to a successful issue. Since the last meeting he had served on a committee of inspection in regard to the affairs of the Gold Coast Company, and he was convinced from what he had heard and seen in his enquiries in connection with that company, that the West Coast of Africa possesses great mineral wealth, and he had no doubt that if this company had the necessary amount of capital it might with good management be made a great success. The directors were to be commended for what they had done for the company, and he hoped they would continue their exertions until they saw better times.

Capt. MACDONALD thought mining operations should have been suspended earlier, as he had recommended 18 months ago, when a member of the board. He complained that the accounts should have been made up to a later date, and

asked why no reference was made in the report to the action brought against the company by Mr. Morris?

The CHAIRMAN replied that the action referred to was decided against the company in the City of London Court, when judgment was given for 50s., and with the costs the amount was brought up to 92s.; but the reason why it was not mentioned was that it was still under appeal, as they were advised that the decision was entirely wrong, and would be reversed. They were compelled to make the balance-sheet up to Dec. 31, and the meeting had been delayed for the reasons he had already stated.

The CHAIRMAN, in reply to further questions, said the balance at the bank was larger now than when the accounts for 10 guineas were made up. He was not aware that their medical adviser had been dealing in concessions; but enquiries would be made into the matter. It was, however, questionable whether a medical adviser would not be at perfect liberty to deal in concessions, as he could hardly be termed an officer of the company.

Capt. MACDONALD strongly opposed the granting of any additional fees to the auditors, Messrs. Foster, Hight, and Co., contending that as they had got about 15,000s. out of the formation of the company as promoters, they ought to be well contented to look over the accounts for 10 guineas.

Mr. EDWARDS said the property was leasehold, not freehold, as it was described. He described the balance-sheet as merely a debtor and creditor account, and having expressed his agreement with the previous speaker that the auditors had had quite enough out of the company, asked whether the directors had formed any idea whether they would issue debentures?

The CHAIRMAN replied that that was one of the subjects which had engaged the attention of the board; but he had been informed by those well able to judge that it would be a waste of time and money to attempt to issue debentures at the present time.

Mr. BEVAN expressed the obligations of the shareholders to the present board, and asked whether the 5000s. due to the vendor could not be set off against the amount due from the vendor to the company for calls?—The CHAIRMAN said that was a matter which they would deal with directly there was anybody to treat with. At present no letters of administration had been taken out of Mr. Fitzgerald's estate.

Mr. FOSTER, in reply to Mr. EDWARDS, said the company could not show a revenue account as it was not trading. They could only treat the expenses as an asset, and when they company got into the condition of having a revenue these items would have to be dealt with.

The motion was then put and carried with two dissentients.

The CHAIRMAN moved the reappointment of Messrs. Foster, Hight, and Co. as auditors, at the same remuneration as before.—Mr. COLEMAN seconded the motion, whereupon an amendment was moved by Mr. EDWARDS, and seconded by Capt. MACDONALD, that Mr. T. S. Evans should be appointed auditor. The amendment was negatived, only the mover and seconder voting for it, and the original proposition was carried.

The meeting closed with a vote of thanks to the directors.

#### BARANCANES COPPER MINING COMPANY.

The ordinary general meeting of shareholders was held at the offices of the company, Cannon-street, on Wednesday.

Mr. EDMUND A. PONTIFEX in the chair.

Mr. DANIEL WILLINK (the secretary) read the notice convening the meeting. The report and accounts were taken as read.

The CHAIRMAN said: Gentlemen, I do not know whether the scanty attendance of the shareholders indicates a lack of interest in the enterprise or confidence in the directors; but if you please we will take it that it indicates the latter rather than the former. At all events if it does indicate confidence in us I assure you that it shall not be misplaced, as far as our endeavours can direct this enterprise, so as to yield the best possible results that can be obtained from it. This, as you are aware, is our first annual general meeting, and the record we have to lay before you is almost entirely on account of the proceedings which we have taken with the view to bring your property into a paying condition; and of course the time that has elapsed, seeing that we had to open an almost entirely new mine, is not been long enough for us yet to do much more than that, but I think we have been doing very well, and you will agree with me that we have done so satisfactorily, economically, and efficiently. The machinery which we have sent out has all been erected, and it is all in perfect working order. This has been done under considerable difficulties, on account of the position of the property, being some distance from the railway station and so forth, and having to do with Portuguese officials, who are very dilatory in their proceedings, and it has been erected with fair promptitude and at a very moderate cost. We have erected at the works buildings and machinery of every description necessary for treating 300 tons of ore monthly, consisting of two engines—the drawing and pumping engine and the engine for the dressing machinery and so on, and we have done all this for a cost of under 4000s.; and I do not think it would have been possible, considering the distance we are from our base of operations, to have done what we have at a less cost than that. We have also proceeded as vigorously as circumstances permitted with the sinking of the new shaft, in order to be able to work the mine when it is reached both expeditiously and economically. We have had some few drawbacks and disappointments, which have a little delayed us, but only those incident to almost every enterprise of this nature. During the autumn months the services of the skilled English workmen were most important and were most required, they were almost all prostrated for about two months by the fever and ague, which obtains in the immediate neighbourhood of the mines during those months, and Capt. Gariand, our superintendent there, was absolutely denuded of every English workman on whose assistance he could rely. He, himself, and the clerk did not suffer at all, owing to their lodging at Almôdovar, a village about 4 miles away, and this experience will enable us as we hope to guard against the recurrence of this in future; first of all, by the services of the local labour, and secondly, by also during the autumn months at Almôdovar, and be brought over to the mine by a conveyance which has been provided for that purpose, and, secondly, because now that we have all the machinery erected, and the difficult work is completed, we are getting rid of every English workman that we possibly can dispense with, so that we may avail ourselves of the native labour, which for that purpose is very fairly efficient, and which, of course, is very much cheaper. At the present moment we have only seven Englishmen at the mine, so that our costs are reduced to a minimum. We were also delayed a little in the early part of the year by the most unusual wet season, which they had there. Had we completed the erection of our machinery that would have been immaterial, because our pumping machinery is far more than adequate to deal with any quantity of water that we are likely to have there, but it was not completed at that time, and during the months of March and April we were delayed in sinking the shaft, which is the most important operation we have now to conduct. We wish to sink the shaft in order to tap the ore 10 fms. below the present level, at which point we have every assurance, so far as there is any certainty in anything of this kind, we have a certainty of being able to find ore in very large and paying quantities. These two circumstances—the sickness of our men in the autumn, and the influx of water in the spring—delayed us for about four or five months, but this has been the whole extent of our disappointments in the initiation of this undertaking, so far as the practical working of the thing goes, and I do not think they amount to very much, although it has inconvenienced us, because in the meantime the monthly outgoings have kept on while we have not been getting returns from the ore, and we shall be five months later getting the returns than we should otherwise have had. I trust that you will all agree with me that we have no reason to be disappointed with it on the whole. Unquestionably the upper workings will not yield quite so much ore as we had expected, but Capt. Gariand, who examined the property originally stated all through that the ore was of that character—comparatively poor at the surface, and increasing both in richness and in size as it deepens; and Capt. Gariand, who has now been there for a year and a half, and has had every opportunity of studying the character of the deposit—far more so of course than any person going out for a few days only—is firmly convinced of the truth of that opinion, and so expresses himself in his report. I trust that you will all agree with me that for some years ago he was one of the officers of the Cape Copper Mining Company, working the great Ookiep Mine at the Cape, and as I am Chairman of that company I know something about him. Since then he has been engaged for Messrs. John Taylor and Sons at other places, and he has always given the most complete satisfaction; in fact, they told me when I engaged him for this company that they considered him to be one of the best men on their staff, not merely as a miner—though he is an admirable miner and dresser—but as being thoroughly honest and reliable and cautious to a degree. If he says a thing you may rely on it being done and something more, and he will commit himself to anything that he is not morally certain of being able to fulfil. Therefore, when we look a man of that kind speaking so highly of our mining prospects I think we may look forward, within a few months indeed, to having a very profitable mine. The only difficulty of any magnitude we have had to encounter has been the chronic one of most enterprises in these days—shortness of capital. You have already explained to you the circumstances under which we are short of capital, owing to the failure of the vendor. The vendor was so sanguine as to the value of the property that he consented to modify his agreement, and to take almost all the purchase-money in shares, and when subsequently we found that a portion of the working capital that we had relied upon obtaining by reason of the bringing to market of the stuff at surface, or alleged to be on the spot, was not forthcoming, he at once, with his partner in the transaction, agreed to find a large amount of working capital. They, in fact, undertook to take up a large number of shares, but misfortune overtook them, and they have not been in a position to pay up their calls, and the result has been that we have been very much crippled in means. We have to a great extent rectified that by issuing a second series of debentures. The debentures that have been already placed could have been sufficient to have carried us up to the point which we hope shortly to attain—when the 34 is reached at which time we hope and expect that the returns will more than meet our expenses by a good deal; but the delays I have spoken of rather disappointed us of that, and we are, therefore, now in the position that although we have money to go on with for the next month or two, unless the ore comes forward more rapidly than we can rely upon with any confidence, we shall be certainly short of means to continue working down to the point of which I have before spoken. We, therefore, urge strongly upon the shareholders in their own interests to come forward and help us to take up the remaining debentures. You will remember the very advantageous terms we were enabled to offer you these debentures upon, and to offer them without any sacrifice to the company, inasmuch as the bonus shares which were offered with the debentures are obtained entirely at the expense of the vendors. We represented to them that the position we were in was due to them. They met us with very good grace, and enabled us to offer these terms to the debenture-holders. The debentures, capital, and interest are all to be repaid before any dividend whatever is paid to the ordinary shareholders, and the debenture-holders receive 10s. bonus share free in respect of every 12s. subscribed to the debentures. The terms are certainly very favourable, but not at the expense of the company. I may tell you that the concern is being managed at the smallest possible cost. We pay our secretary a very small salary, and we only pay 50s. a year for offices. The directors have not taken a farthing for their fees, and every penny subscribed for the debentures will go in mining. I feel sure that the capital thus provided will shortly be repaid many times over. I believe you have all had a

copy of the letter which Mr. William Trotter, one of the largest shareholders, who personally visited the mine, was good enough to address to the board. He is present to-day, and I may say that you may place the highest reliance on his statements. I believe you have in that mine a very valuable property, which will eventually result in disappointment to nobody. There is no other point, I think, that I ought to touch upon, but if there are any points upon which the shareholders require fuller explanations I shall be very happy to give them full and frankly. With these observations I beg to move "That the report and accounts which have been presented to you be received and adopted."

Mr. JOHN HARTLEY: Mr. Chairman and gentlemen, I have been asked to second the resolution which has been put before you by the Chairman, and I do so with pleasure. It is very seldom, I think, that the prognostications of a prospectus are always realised, but on the main points in this case they have been. We find the expenses of carriage—which are a very material consideration—of sending the ore to this country have been fully covered by the calculation made in the prospectus; and the quality of the ore, so far as we have been able to test it from the small shipments sent home, fully bear out the report made by the engineer which accompanied the prospectus. Capt. Gariand has all along given us to understand that when we attain a greater depth the ore will improve in size and value. The expenses, which you will see cover seventeen months, have been very small, amounting as they do to barely 7000s., including the item of 2394s. on the other side; so that you will see the mine has been managed with the greatest possible economy. There is one thing before sitting down I should like to say, and that is to impress upon all the shareholders who have not subscribed for any debentures that they should do so without delay. The board will do their utmost to keep the property for the shareholders, but if they are apathetic and do not provide the money which is absolutely required, it will be their fault if the mine passes into the hands of those who do provide the means. Better value you could not have. Here is a mine considered by competent authorities to be worth from 100,000s. to 120,000s., while the total issue of debentures is limited to 10,000s., a sum which but little more than represents the amount spent on the machinery, buildings, and useful works.

The CHAIRMAN: As Mr. Trotter is here perhaps he will state the impression which he derived of the property from the visit which he paid to it.

Mr. WILSON: I paid the month of March a short visit to the mine, and during my stay I spent the whole of my time from early morning until dusk on the property. As a very considerable share and debenture holder in the company, I paid what attention I could to the details. I could not at that time go underground to the lowest levels, as the flood to which the Chairman referred was just beginning, and the machinery was not then erected; but from all I saw and heard, I believe we have a magnificent property there. Of course not being an expert, I cannot say whether the ore will increase in richness rapidly or slowly; but I am satisfied in my own mind that in trying to attack the lower levels we do so with every prospect of success. I am so firmly convinced that our only chance is to push down with the new shaft as quickly as possible that I think no expense ought to be spared. We have extensive and very valuable machinery now erected, and there is nothing now except the hardness of the rock and the possible want of funds to prevent us from going down without any check. I should like to ask what are the last accounts by telegraph as to the speed at which the boring is taking place, and whether you can form any estimate when the level will be reached and the cross-cuts driven to the lower levels? I was immensely pleased with what I saw of Captain Gariand. I think he is a very straightforward, hard-working man, and his mastery of the whole of the details is perfectly surprising. He has studied the most efficient modes of dressing the ore, and he is keeping the expenses down to the lowest possible point. He is getting rid of the English workmen, as native labour is much cheaper, and the men are not so liable to the local fever and ague. As a comparatively recent shareholder, I should like to ask what the directors' emolument is fixed at? You say you are not taking any fees; but I suppose they are only in abeyance. I think it is absolutely necessary to push on the mine, for if we were so short of money that the mine filled with water, the staff would be disbanded, and the value of the property would be materially lessened. I think we should all put our shoulders to the wheel and see if we cannot raise all the money that is required, and if the other shareholders will join with me, although I have already subscribed in excess of my proportion of the debentures, I am willing to subscribe further, so that there may be no doubt about the future of the property.

The CHAIRMAN: In answer to the questions which Mr. Trotter has put to me, as to the progress made with the sinking of the shaft, he said that on the 24th inst. we only commenced sinking at the beginning of July, and, therefore, I cannot speak with any certainty from experience as to the speed with which it can be continued; but Capt. Gariand, who has been right in all his calculations hitherto, although he has found the rock harder than he anticipated, anticipates being into the lode by February next; but, probably, I should think, we shall be there by the end of the year. From the bottom of the shaft he will only have to cross-cut about 40 ft., as the angle of the shaft is such that it approximates to the lode in depth. As to the directors' remuneration, the amount the machinery is entitled to is provided by the Articles of Association. I think it is 1100s. a year. However, we have received nothing, nor do we mean to until the company can afford to pay the fees. It appears in the accounts as part of the 2225s. on open account. Of course, we have a great deal of work to do, and a great amount of anxiety. If you can afford to pay the remuneration which the Articles provide, you will not grudge it; if you cannot afford it, you will not have to pay it.

Mr. J. S. TROTTER confirmed what had been said as to the necessity of providing the capital required at once. The expenses in London, he thought, compared with the company's expenses, were very moderate. The working expenses as well as the cost of transport were very moderate, and the richness of the ore enabled them to obtain a very good price for it. If they had funds in hand they could economise considerably in regard to coal, upon which, by sending a cargo, they could save about 20s. a month.

The CHAIRMAN, in reply to Mr. W. TROTTER, said very little stopping had been done at present, but the ore discovered left no doubt that the mine was worth a good deal more than the 10,000s. to be raised on the debentures, while the machinery was worth the greater part of that amount.

The report and accounts were then unanimously adopted.

The CHAIRMAN added that they only required 3500s. further to be subscribed. This would, he believed, enable them to reach the 34 fm. level, and in a very short time they would be making good returns. He believed that the debentures would be paid off very rapidly, and that the shareholders would then commence to receive dividends. The debenture subscriptions would be used solely in mining operations.

Mr. HARTLEY said overtures had been made to the company to treat the ore on the premises, and as the mine was so rich, and as their machinery would treat 300 tons of ore a month, they would probably be able to earn something in that way, as some considerable time must elapse before their own raisings would exceed the capacity of the machinery. There were other mines in the neighbourhood which would doubtless be worked if this company's operations should prove successful, as he had no doubt they would. It was not only English engineers who had reported favourably on the mine, but some of the leading French engineers had given similar reports. One of the most able French engineers living had recently told him that in all his experience he had never seen richer ore than that of the mine, which was much richer than that of the Mason and Barry and Rio Tinto Companies, and the mines further to the south.

The SECRETARY, in reply to a question, said there were 115 shareholders in the company.

Mr. W. TROTTER proposed a vote of thanks to the Chairman and directors.—Major DUNDAS seconded the proposition, which was carried.

The meeting then closed.

WICKLOW COPPER MINE COMPANY.—An extraordinary general meeting of the shareholders was held at the offices of the company in Dublin, on Monday, for the purpose of considering the following resolutions, adopted at the late meeting of shareholders:—"That the sum of 2500s. be paid to E. Breslin, C. Cummins, J. Hodge, J. S. Stevenson, W. Mulrooney, and J. C. Bennett, directors of the company, as remuneration for their past services, and that such payment be made by transferring to them bonds for that amount, payable for that sum of 500s. included in the mortgage deed of Dec. 11, 1883, when same shall have been released by the mortgages." "That the remuneration of the directors for the future shall be at the rate of 60s. per annum, to commence from Sept. 1, 1884."—Mr. C. Cummins, who presided, explained that the resolutions in question did not emanate from the directors, but from a committee of shareholders. He said the question was one altogether for the shareholders, but he might add that the life and death of the company depended on the adoption of the resolutions. It was also most important that the decision should be arrived at at once, as a moment's delay would be fatal to the company.—Dr. Wright having proposed, and Mr. Faile seconded the adoption of the first resolution, Mr. M. E. Solomons strongly opposed the motion, which he considered the most monstrous ever submitted to a meeting of shareholders. He said the company were getting worse and worse, and now the shareholders were asked to sink themselves deeper still in the mire by frittering away their funds.—Mr. Farquharson said if they did not adopt this resolution they might as well wind up, and then the shareholders would not get sixpence. The directors were willing to accept a good resolution, but they were the company, but they were now no more than a company on operations.—The resolution was adopted. Mr. Solomons objected.—Dr. Wright proposed, and Mr. Farquharson seconded, "That the sum of 800s. be placed at the disposal of the directors for their services for the year ending Sept. 1, 1885."—Mr. Solomons proposed, as an amendment, that the directors should receive no remuneration until the working of the concern yielded a dividend of 3 per cent. The amendment was lost and the resolution carried. A vote of thanks having been accorded to the Chairman, the proceedings terminated.

EAST CRAVEN MOOR.—At the meeting, on Thursday (Mr. E. J. Drew in the chair), the resolution authorising the liquidator to transfer the company's property to the Craven Moor United Lead Company, and approving the agreement as between the East Craven Moor and West Craven Moor Companies, was confirmed.

WEST CRAVEN MOOR.—At the meeting, on Thursday (Mr. E. J. Drew in the chair), a resolution similar to that above referred to was confirmed. The Chairman explained that the companies had not gone into liquidation because they were hopelessly in debt and difficulties, but because it was considered advisable that both mines should be worked together under one management, and for that purpose it was necessary to amalgamate. Before this could be done both this and the East Craven Moor Company had to go through the form of liquidation.

(For remainder of Meetings see this day's Journal.)

RECENT DEVELOPMENTS OF AUSTRALIAN MINERAL RESOURCES.—Previous to the year 1851 coal was the only mineral raised in New South Wales, and even up to the year 1871 the only minerals which had been worked were coal, shale, gold, copper, and antimony; but of late years tin, silver, iron, lead, asbestos, and bismuth have been added to the mineral products of the colony.

## BRITISH ENTERPRISE IN ARIZONA—MODEL SMELTING WORKS.

The amount of money wasted by the Arizona Copper Company, and the exorbitant price at which the property was acquired make it in the highest degree improbable that the original speculators who paid for their shares will ever receive any reasonable return for their money; but it is less certain that the abandonment of the undertaking altogether is preferable to an attempt to recover something by continuing. This at least seems to be the view taken by many of the shareholders at the meeting last week, which was called with a view to the resolutions, if confirmed, becoming special resolutions of the company. The resolutions, which have already been published, confirm certain agreements, wind the company up voluntarily, appoint liquidators, and resolve to form a new company under the same name. Replying to an enquiry for details as to the works at Clifton, the Chairman said that as yet the only information the directors had received from Clifton since the blowing-in of the smelters had been by telegraph, and it was of a very meagre description. But the shareholders might rest assured that it was the intention of the board to afford every information they legitimately could. As soon as they could give any information they would. He moved the adoption of the resolutions.—Mr. John Wilson seconded. He said he could not but congratulate the shareholders at having reached the stage they had. Certainly, two months ago, instead of meeting to adopt a reconstitution, and thereby a prolongation and really a starting of the company's business it had looked as if they would have required to liquidate. The amount of worry and anxiety and toil connected with the company was greater than in any company he ever had to do with. But it had ended successfully, they had positively got hold of their valuable property. They had got the smelters in operation; they were smelting copper. It would now be the duty of the board to enter into all necessary details connected with the carrying on of the business. Hitherto their labours had been more with the view of saving the company, but now they would be in connection with carrying it on. The directors had already made some very satisfactory arrangements, and the company might look forward to a very prosperous career. According to the board's estimate, even with the present low price of copper there would be a profit. There was an expectation in America that a number of the smaller copper companies would have to stop, and copper would then probably get firmer. He believed that company had now the best works in America, and their employees in Arizona were very loyal to them. He thought everything now looked hopeful for a fairly successful course in the future, as a reward for all the trouble and anxiety in the past.

It will be gratifying to shareholders to learn that the hopeful views expressed at the meeting seem to be to some extent justified by the position entertained in the locality of the company's works that the new plant is the largest and most complete in the West. The Clifton Clarion remarks that few people outside the town of Clifton and its immediate vicinity have any idea of the extent and capacity of the new reduction works of the Arizona Copper Company now just completed. Last Sunday a representative of the Clarion visited the works, and was courteously shown over the entire establishment by Mr. Hugo Arnolds, superintendent of the mines and smelters. The reporter was somewhat dazzled by the array of smelters, machinery, railroad tracks, and ore-houses which met his gaze, and Mr. Arnolds kindly helped him out by a lucid explanation of the plan and arrangement of the new plant. The works are situated between the San Francisco river and Chase Creek, and at the foot of a rocky peak which rises its jagged head nearly 500 ft. above the river bed. The face of the towering cliff has been blasted down for a distance of nearly 100 ft., forming four rocky terraces, and on these terraces the buildings and machinery have been erected. Work was begun last September, and has been steadily prosecuted ever since. The work of excavation alone was a task of no easy execution, and required months of labour to put the ground in shape for the placing of the plant. The upper terrace is 50 ft. above the furnace floors, and above it the beetling cliff towers to a height of 400 ft. Here are located the ore bins; these bins are 250 ft. in length and 25 ft. in width. Through the centre their entire length a strong partition of thick plank divides them into separate compartments. On the top of this dividing line, if we may so term it, runs a railroad track, 20-in. gauge, which brings the ore directly from the mines on Chase Creek, and dumps it into the ore bins on either side. The lime and iron fluxes are also brought from the mines in the same manner, and delivered into separate bins from the same track. The capacity of this row of ore bins is 4500 tons, including the fluxes.

The ores and their fluxes from this upper store-house are now drawn off by means of ore-gates into sheet-iron cars, and conveyed over an iron track a distance of 12 ft. to the crushing-house, which stands on the second terrace. Here the ore is crushed by two Blake pulverisers. There is also on this floor a rotary crusher known as the "Comet" patent, which reduces the lime and iron fluxes. It is a powerful machine, with an action similar to a huge coffee mill, and is also used in breaking copper rock of a hard and refractory character. This crushing-house is 60 ft. long by 45 ft. wide. Its situation below the ore bins is such that the rock is dumped directly into the crushing machines, and after being broken, is discharged through gates into cars which carry it by rail a distance of 12 ft. to the store bins. These store bins are built on the third terrace of the hill, and are 250 ft. long and 12 ft. wide, and have a capacity of 2200 tons. They are arranged in compartments for ore and fluxes like the bins above, and are solidly constructed. On the same terrace, and separated from the store bins by a space of 10 ft. are the fine ore and coke bins. These latter bins are also divided into compartments, and have a length of 225 ft. and a width of 25 ft.

Over the space between these two rows of coke and ore-houses a double railroad track has been laid. One of the tracks is a 20-in. gauge, and connects with the road, which winds its way to the mines on Chase Creek. It brings from the ore shutes at those mines the copper ores already crushed, and which do not require to be passed through the rock breakers. The 36-in. track, which adjoins it, connects with the narrow gauge to Lordsburg. Over this track the coke supply for the smelters is brought, and dumped into the lower line of bins. Thus the ore, the coke, and the fluxes, are landed in front of the furnaces, with but little expense of manual labour in their delivery. The ores and fluxes are next conveyed in iron hand cars to the supply bins, situated on the charging floor of the furnaces. There are 38 of these rooms, 5 ft. in height and 6 ft. in length, but varying in width, and of different capacities. Some are for ore, some for coke, and others receive the fluxes. When filled, they will hold sufficient material to keep the furnaces running for 12 hours. It is the intention to have them filled every evening, so that the works can be kept running all night without drawing on the ore-houses on the upper terraces. By this plan the expense of a night shift bringing material to the furnace floor is done away with. As the ores, fluxes, and coke, falls through the supply bins to the furnace floor, it is shovelled into wheelbarrows and conveyed a few feet to a charging scale of six beams, every charge weighed, and then wheeled to the furnace doors. There are five of these scales—one opposite each furnace, and not over 10 ft. from them.

The ores with their fuel and fluxing material are now landed at the furnaces, and while the dusky sons of Sonora are busily shovelling in the charges, let us walk back a few steps to the third terrace, and take a look at the sampling works. These works adjoin the fine ore bins already mentioned. When the broken and pulverised rock from the mines is dumped into these storing places it falls on an incline covered with strong sheet iron. At a distance of 15 in. apart, slits 2½ in. wide and 20 in. long have been cut. As the ore passes over this incline to the bins below certain quantities go through these slits into small compartments known as sampling bins. From these bins it is carried by cars to the large sampling-room, where it is crushed fine by two 7 by 10 Blake crushers. As the ore is being crushed small samples are caught by an ingenious contrivance of revolving buckets, which are set in motion by the action of the crushers. These buckets make about 10 revolutions per minute, and take samples from every car load. The samples are then spread on the ore floor, quartered in the regular way, and carefully tested in the assay office. The remainder of

sampled ore, after being crushed, is stored in small bins, and is taken to the furnaces when the lot from which it was taken is to be passed through the smelter.

The great recommendation of the arrangement is that all the material to be smelted is conveyed to the furnace from the upper terraces almost entirely by the power of gravity. There is no handling of the ores, and nearly all the process is automatic. The only time the ore is shovelled is in its short passage from the supply bins to the furnaces, and this could not have been avoided. The plan is inexpensive, expeditious, and complete in all its various details. The plant consists of five furnaces, of these three are of 60 tons daily capacity each, and two of 30 tons each. They are of the crucible water-jacket pattern, and are provided with all the latest improvements for the reduction of copper ores. The three largest were built by Messrs. Fraser and Chalmers, of Chicago, and the smaller one by Messrs. Rankin, Brayton, and Co., of San Francisco. The former firm have supplied the company with nearly all the machinery for the works, and it is of first-class make and of the most approved style. The smoke from the furnaces is drawn off by large sheet-iron pipes above the charging-floor, and carried into a brick flue 5 ft. by 6½ ft., which connects with the condensation chambers. These chambers are 30 ft. by 50 ft. and 15 ft. high, and are divided into three compartments. Through these chambers the smoke has a strong and rapid circulation, and the friction against the walls of the chamber causes the fine ore dust it carries with it to settle at the bottom. By this mode of handling the smoke it is estimated that from 5 to 10 per cent. of the ore will be saved which would otherwise be lost. After leaving the condensation chambers the smoke escapes through an immense sheet-iron stack 100 ft. high and 6 ft. in diameter. The fine dust thus saved is made into bricks and again passed through the furnaces.

The power to move the entire plant is supplied by the San Francisco river, the waters of which are conveyed a distance of 8350 ft., to the works. By a suitable dam the water in the river is raised 7 ft., which gives an ample supply. Some idea of the extent of the dam and flume can be formed when it is stated that 325,000 ft. of lumber has been used in its construction. At the end of the flume two turbine wheels receive the water, and set in motion the power that moves the machinery throughout the entire structure. One of these wheels is situated north of the furnaces, and distance from them 75 ft. This wheel is 44 in. in diameter, and with a 24-ft. fall of water has a capacity of 142-horse power. Close by this wheel, and between it and the furnaces, are situated five blowers, connected by belting with the main shaft. These blowers discharge their blast into one main blast-pipe 36-in. in diameter. This pipe extends along the rear of the furnaces, and is tapped for each by a pipe running from it at right angles, which conveys the blast to the interior of the furnace. At each blower, as well as at the entrance to each smelter, the power is regulated by means of blast gates, and the capacity of the furnace can be increased or reduced. About 150 ft. east of the large wheel is a smaller turbine, 23 in. in diameter, giving with a 24-ft. head of water 40-horse power. This smaller wheel is used for the purpose of driving the crushers in the sampling works and the crushing house, the power being transmitted to those points by means of wire-ropes.

Besides this water-power the company have erected three engines—one 12 by 20 by 36, a compound Corliss—to drive the blowers in case the river should get too low. Another engine is 9 by 16, an automatic cut-off, to drive the crushers in the crushing-room, and another 8 by 12 automatic cut-off to drive the crushers in the sampling works. The boilers that supply steam to these engines are 60 in. by 16 ft., and are made of Otis steel-plates. They are firmly set in brick in a stone foundation, as are also the engines. It is not expected that water will fail more than one or two months at most during the entire year, but the company have taken the precaution to have steam ready should the turbines be unable to run. The capacity of the works, when fully under way, will be from 225 to 250 tons of ore every 24 hours. The quantity of coke required will, it is expected, amount to fully 25 tons daily. When in full operation there will such a stream of copper bullion flow out of Clifton as was never before known in the history of Arizona. Every contingency has been provided against, and no enterprise of the kind was ever started in the West that is so well equipped for the making of copper bullion.

## THE LAW OF COLLIERIES.

The great defect in many of the treatises on mining law arises not from any want of studious research on the part of the author nor from insufficient general legal knowledge, but from his having attempted to deal with matters about which he knows absolutely nothing, though he is unaware of his ignorance, owing to the different technical language used in different districts having led him astray. It was doubtless due to the circumstance that Mr. FOWLER took up a particular branch of mining law, and dealt with it intelligently and thoroughly—having had personal experience of the matters about which he wrote—that his *Collieries and Colliers* acquired so high a reputation and secured so wide a circulation. The necessity for a fourth edition has now arisen, and as several alterations of the law affecting colliery property have recently been made the work has been virtually rewritten and issued under a new and more comprehensive title—*The Law of Collieries: A Handbook of the Law and Leading Cases*. Edited by JOHN COKE FOWLER, stipendiary magistrate for Swansea, and DAVID LEWIS, barrister-at-law. London: W. Maxwell and Son, Bell-yard, Temple Bar—the additions and corrections made bringing it down to the present time. The author mentions that he has been joined in the preparation of the present edition by Mr. David Lewis, of the South Wales Circuit, who has had ample opportunities of becoming acquainted with the various incidents of the working of coal. No work has hitherto been published which treats specially of the legal matters connected with collieries, to the exclusion of other kinds of mining. But the vast interests involved in coal mining fully justify the production of a work in which those interests alone will be the subject. The successive chapters will be found to treat more or less fully of all the legal incidents of this kind of mineral property, such as the right to coal under copyhold lands and commons, railways, and canals. There are chapters on leases and covenants; on title by prescription, and the statute relating to that title; on fixtures; rights of way; rights connected with the flow of water, both natural and artificial, on the surface and subterraneous. The latest leading cases relating to all these subjects have been carefully examined and quoted. There is a chapter on partnership, which has been for the most part rewritten, and brought into accord with the law as it exists at the present day. The relations between the proprietors and occupiers of collieries and the workmen employed by them have been defined and explained as accurately as such relations admit of definition and explanation, and all questions commonly raised between them as to stoppage of work, misconduct, &c., have been fully considered. The responsibility of employers for negligence under the Employers' Liability Act has been discussed and illustrated by all the most valuable judgments that have appeared in the reports since the passing of the Act; which, on account of its importance, is set out verbatim.

The chapter on the rating of collieries is particularly interesting and exhaustive; the statutes which bear upon rating are first pointed out, then the meaning of rateable occupation is explained as well as the principle or basis on which the rating ought to be settled, with the practical application of the principle to some particular cases. It is mentioned that by the statute 43 Eliz. c. ii. s. 1, it is enacted that the churchwardens and overseers or the greater part of them shall take order from time to time, by and with the consent of two justices of the same county, whereof one to be of the quorum, dwelling in or near the same parish or division where the same parish doth lie, to raise weekly or otherwise, by taxation of every inhabitant, parson, vicar, and other, and of every occupier of lands, houses, tithes, impropriate, proprietors of tithes, coal mines, or saleable underwoods in the said parish, in such competent sum or sums of money as they shall think fit for the relief of the poor. Coal mines are thus expressly made liable to the poor rate. By the Rating Act, 1874, all mines are now rateable on the same principle as coal mines, except

lead, tin, and copper mines; the method of rating which is specified in the statute.

By the Union Assessment Committee Act of 1862 provision has been made for securing uniform and correct valuations of property in the unions of England. For this end the board of guardians appoints not less than six nor more than twelve of their number to the "Assessment Committee" of the union for the investigation and supervision of the valuations of rateable property. It is not necessary to refer more particularly to the enactments of that statute which has no important bearing upon the principle and method of rating collieries. It will indeed secure a uniform rating according to some one system throughout all the collieries comprised in the union, but it does not affect to determine what that system shall be. Although the statute gives authority to the officers of the parish to rate in such a sum as they may think fit, it does not import that they may arbitrarily impose the rate. They are to rate the occupier fairly and justly, according to the value of the occupation, and with reference to the rating of others. If a party rated may appeal against the rate on the ground that he over rated himself or that others are under rated. The statute 6 & 7 Will. IV. c. xvi. enacts that the assessment upon lands is to be made upon an estimate of their net annual value, which is defined to be the rent at which they might reasonably be expected to let from year to year free of all tenants' rates and taxes and commutation rent charge, if any, and deducting the probable average of annual costs of repairs, insurance, and other expenses which would be necessary to maintain the premises in a state to command a rent.

It will have been seen that the rate is to be by taxation of the "occupier" of coal mines, &c., and it is, therefore, necessary to define in general terms who are to be considered as the occupiers of a description of property. The occupier intended is the actual tenant, and not the lessor. The rate is to be levied upon and demanded from the "occupier," but as "rent" is by the statute made the basis of the rate, it is substantially a landlord's burden. When an owner is also the occupier by himself, his agent or servants, then he is personally rateable. A question may occasionally, though rarely, arise as to who is the person who ought legally to be rated. If the person occupying is a lessee, there can be no doubt that he is the occupier as the lease conveys to him an exclusive interest in and possession of the property demised. But a license to work minerals is not distinguishable from a lease, and is only an incorporeal hereditament or mere right. Yet as it confers a right to enter, work, and carry away part of the land itself—the minerals, it seems clear that it is a right as this is an interest in land.

The next point relates to the position of the occupier with regard to the value of his occupation. There is no doubt that the occupation must be beneficial, or rather, profitable, in some sense; that some advantage and profit must attend it, and consequently, if a colliery is shut up, and not worked at all, it is not, during that period, rateable. But in order to show a right of exemption from rating it must be proved that the occupier receives nothing from the property for himself or for anybody else, and that if he were assessed he would have no funds out of which to pay the assessment, except resources not drawn from the property in question. . . . There it appears that if competent persons come to the conclusion that under the special circumstances of the colliery, no rent could be obtained, if it were in the market to be let, then that colliery would not be liable to be rated at all. . . . It seems, upon the whole, that so long as any profit is realised by the owner or occupier on a subsisting subject matter which is legally liable to the incidence of the rate, so long will that property be rateable, although it may be a losing concern in the hands of some of the parties interested. If these cases do not seem at first sight to be perfectly clear, it may be epitomised thus: If a colliery is absolutely unproductive, is not rateable, though the lessee may by a bad bargain be bound to continue payments to the lessor. But if the colliery is at all productive and a rent is paid, the occupier is rateable, though the concern may be to him unprofitable. The question who is to be considered the occupier is a matter of fact, to be found, if disputed, the sessions, and the Court of Queen's Bench will hold themselves concluded by their finding.

The next and most important question is how and upon what principle or basis is the actual rateable value to be obtained. We approach the practical methods of rating collieries, and in dealing with this question the enactments of the Parochial Assessment Act must never be lost sight of. The poor rate is imposed in respect of the net annual value of the property, which the statute proceeds to define to mean the rent at which the same might be reasonably expected to let from year to year, free of all the usual tenants' rates and taxes, and tithe commutation rent charge (if any), and deducting therefrom the probable average of annual costs of repairs, insurance, and any other expenses which may be necessary to maintain the premises in a state to command such rent. There are various methods by which the professional valuer seeks to arrive at the rateable value of collieries. In practice, all minerals are let on lease for long terms of years, under which the lessees covenant to pay certain dead or sleeping or minimum rents and royalties, or rents, on all quantities worked beyond the quantities specified by worked in consideration of the fixed rents. The lessees also covenant to pay annual rents for all land taken for the pits, buildings and plant, and to sink the pits or drive the adits and levels, and erect the necessary buildings and engines. In working out a valuation the professional valuer having obtained the necessary information, and having fully weighed the particular circumstances of the colliery, estimates the royalty which, if the colliery were then let to the owner might reasonably expect to obtain. The leading circumstances which determine it are the situation, facilities of shipment, quality, and probable cost of working.

Coal mines must be valued, like land, on estimates of the probable produce that may be properly expected to be worked at the time the valuation, which calculation must have reference to the produce of the colliery in the year preceding the valuation. The rent is to be extravagant or exceptional, but a reasonable rent, which is the measure of annual value. . . . In some cases attempts have been made to work out the valuation of collieries on the principles laid down for rating railways—that is, by taking the receipts deducting the expenditure, and making a further allowance for interest on floating capital and tenants' profits; but it has been found that such enquiries were felt to be inquisitorial, and were attended with so many difficulties as to what were really working expenses and tenants' capital, that this system cannot be recommended.

The volume throughout displays an intimate practical acquaintance with colliery matters and the law affecting them, and the study of it will prove alike useful to members of the legal profession practising in colliery districts, and to all engaged in the working and management of collieries.

POPULAR EDUCATION IN AUSTRALIA.—The New South Wales Minister for Public Instruction says, in a recently published report that there are very few children in the colony who do not for some period in each year receive instruction, either in schools or at home. The greater number of exceptions are amongst children from 13 to 14 years of age, whose labour is of value to their parents. Many of these, however, especially those in the country, learned to read and write, and cipher before they left school. In places where schools are opened for the first time, it might be supposed that the children to attend them had previously been without schooling, but in most cases the necessity for a school in any locality has been caused by a recent movement of population thereto from other settlements, and the children when enrolled are generally found to have been at school elsewhere.

LOVELL.—At the meeting on Tuesday (Mr. G. P. Bidder in the chair), the accounts for the eight months ended June 4, showed a debit balance of 798l. 11s. 3d. A call of 12s. per share was made payable in two instalments. Capt. Joseph Priak, after reporting upon the various points of operation, says that the mine is worked with the utmost economy, and the general expenditure in future will be a little less, and as soon as they have sufficient water for stamping the returns will increase.

## GEOLOGY AND MINERAL WEALTH OF KANSAS.

The authorities that govern the individual states and territories of America show themselves, says Mr. G. P. BEVAN, in an interesting article in Nature, well advised when they set to work to investigate the natural history and resources of their respective possessions in a healthy and unbiased spirit, and nothing is more calculated to give confidence in the future of the State than the knowledge that the truth, the whole truth, and nothing but the truth has been presented to all who are interested, with the indorsement of well-known scientific experts. The State of Kansas, which not many years back was exercised and torn to pieces with internecine quarrels and filling-forays, as to obtain the dolorous name of "bleeding Kansas," now appears before the world in very different guise—no longer bleeding, but with its wounds staunch; not restless, but peaceful, and bent on carrying out to the utmost the programme of wealth and prosperity which a careful examination of its capabilities shows to be not only possible but assured.

From the geological sketch given by Mr. O. St. John, in the third annual report of the State Board of Agriculture, we learn that Kansas, a parallelogram in shape, and containing no less than 80,000 square miles, or 52,531,200 acres, lies wholly within the prairie region that intervenes between the Rocky Mountains and the Missouri; and, although to the ordinary observer it appears to be an exceedingly flat region (Kansas city has only an elevation of 751 ft. above the sea), there is, in reality, a gradual and regular ascent of the surface to the north-west corner, where the land assumes a maximum height of 4000 ft. What configurative irregularities there are, are principally due to erosion, as there is a remarkable absence of any geological displacement sufficient to produce mountainous folds, and give origin to local drainage systems. The most salient features of the landscape are bluffs (seldom above 500 ft. in altitude), though the larger valleys they are sometimes precipitous, and intersected by ravines. The prevailing characteristic, however, is that of grassy uplands in billowy stretches, the drainage being provided for by numberless narrow channels, which are called "draws." The general drainage system is easterly, and pretty well divided between the Missouri and Arkansas basins. The northern half of the State is watered and drained by the Kansas river, with its tributaries, the Delaware and Grasshopper, Blue, Solomon, Republican, and Saline on the north, and the Smoky Hill on the south; and these, with a small area drained by the head waters of the Osage river, all form part of the Missouri system. The basin of the Arkansas is met with a little to the south of the Smoky Hill, the river itself having a general south-east course into the Indian territory. The volume of the Arkansas from its distant source in the Rocky Mountains far exceeds that of the Kansas, though its valley is very little deeper, nor has it such important tributaries as the latter river. About the centre of the State the Arkansas makes a considerable bend, receiving previously the Walnut and Pawnee rivers, while east of the bend are the upper valleys of the Neosho, Verdigris, White Water, Little Arkansas, and Cimarron, though as a matter of fact nearly all these streams effect their junction with the Arkansas outside Kansas and in the Indian territory. The Neosho is locally famous for its valuable water-power and its rich agricultural valley, and the Cimarron for its deeply eroded bed and the variegated sculptured strata of its canyon walls. The two typical rivers of Kansas are therefore the Kansas, its valley consisting of a wide belt of low-terraced alluvial land of great fertility, bounded by beautiful slopes terminating in frequent rocky bluffs; and the Arkansas with its magnificent reaches of level bottom land, whose depth of soil is composed of travelled sediments brought from the mountains and plains lying to the westward. Here and there the border uplands encroach upon the valley, showing shelly limestone strata, and deep, iron-dyed sandstone ledges.

The geology of Kansas is of a simple nature, and almost entirely composed of three principal formations—the carboniferous, cretaceous, and tertiary. The palaeozoic rocks, as represented by the carboniferous, appear at the surface over an area of about one-third of the entire extent of the State, entering it from the south-east, and eventually passing beneath the Dakota sandstone, which is the line of demarcation between the palaeozoic and mesozoic series. After the disappearance of the carboniferous rocks underneath this sandstone, they are not seen again until the Rocky Mountains, where their upraised edges have been bared by denudation at the foot of the ranges. The lowest member of the carboniferous (lower) is seen in Kansas, is the Keokuk limestone which occupies a small area of about 40 square miles in the extreme south-east corner, and consists of bluish-grey siliceous limestone, interbedded with cherty layers above, and often associated with brecciated siliceous matter. Limited as the Keokuk area is, it is of exceeding value to the State, for it includes the ore district of lead and zinc, and has already brought a considerable population to the newly-founded towns of Empire and Galena, on the banks of the Short Creek, a tributary of the Arkansas. Not only has a busy mining district been here established, but owing to the excellence and accessibility of the Cherokee coal measures, a little to the west, the ore can be speedily and cheaply reduced at the furnaces of Weir and Pittsburg, a few miles to the north. Galena—the ordinary sulphuret of lead, furnishes almost all the ore of that metal, together with its derivatives, cerussite or carbonate of lead (the "dry bone" of the miners), and pyromorphite or phosphate of lead. As is usually the case, the lead carries a small percentage of silver, from 1 to 1½ oz. to the ton of ore. The zinc ores consist of the common blende or sulphuret, "black jack," calamine (hydrous silicate, smithsonite (carbonate), and zinc bloom, many of the ores being of great beauty from their amber and garnet tint.

Associated with the ores are chalcopryite or copper pyrites, green carbonate of copper, bisulphuret of iron or mundic, calcite or "glass-lime," dolomite, quartz, and bitumen. The base rocks of the district consist of a deposit of limestone 100 ft. in thickness, charged with characteristic Keokuk fossils, which, however, are much comminuted and splintered, and bear evidence of the pressure and tension to which the strata have been subjected. The Kansas ores are similar in almost all parts to those of the Missouri district, and it is considered quite possible that time will reveal the existence of other ore-bearing strata.

The large area of upper carboniferous series may be roughly divided into upper and lower coal measures, the latter occupying between 4000 or 5000 square miles, and passing in the west, conformably beneath the upper measures. The series is largely made up of shales and sandstones, with occasional thin beds of limestone and iron ores, but its chief economic value consists in possessing workable beds of coal. These are mostly distributed in the lower 400 ft. of strata, and are somewhat irregular and variable in thickness. Some of the coals, indeed, are found in little isolated basins or pockets, filling trough-like depressions surrounded by ledges of the older formation; but as a rule, the thinner coal beds are remarkable for their persistence over a large extent of ground. The Cherokee coals are of a very superior quality, and they (together with most of Kansas lower beds) contain less sulphur than the coals of either Illinois or Iowa. Naturally there is a great demand for coking purposes and local consumption, while pretty heavy shipments are made to the towns and cities on the Missouri river. These lower coal measures also contain excellent building stone and hydraulic limestone, which is extensively utilised for making cement. The general inclination of the strata is north of west, with a dip that seldom exceeds 10°. The estimate of the lower coals, from an aggregate thickness of 4 ft., is 20,000,000,000 tons, and if the area be extended to that occupied by the overlying upper measures, so as to reach the lower coals accessible from 500 to 1000 ft., the product may be fairly estimated at double.

The upper coal measures have an aggregate vertical thickness of at least 2200 ft., the exposed area extending for 24,000 square miles; but in the character of the component strata they present a marked contrast to the lower series, on account of the limestone ledges which form such striking features in the landscape. The lower beds are characterised by frequent and thick deposits of grey limestone, succeeded in the middle portion by darker, rusty, weathered ledges, and in the upper by light, buff-grey rock. The sandstones occur in some half-dozen well-developed horizons along the line of the Kansas

valley, usually in the condition of arenaceous shales, and affording local supplies of building and flagging stones. In Osage County these have an additional interest, as being marked with casts and tracks of gigantic Batrachians. The limestone beds are somewhat deteriorated for building purposes by cherty deposits, but, on the other hand, they contain ironstone nodules of hematite and carbonate ores, with crystals of sulphate of lime and beds of massive gypsum, varying in thickness from 5 to 15 ft. These gypsum deposits are capable of affording inexhaustible supplies, which are used most beneficially as manure for the soil. Where the cherty concretions are not met with, the limestone beds yield magnificent building-stone, the texture and colouring of which can be seen to great advantage in the State House of Topeka and many other public buildings. The upper coals are distinguished from the lower by their more brittle texture and a larger percentage of ash and impurities. Though there are several valuable and persistent seams, such as the Blue Mound and Osage coals, thinness is a decided characteristic of the upper measures, few, if any, being above 30 in., and the greater number not exceeding 10 in. But, although the upper measures are clearly of not so much economic importance as the lower, it is quite possible to reach the lower by tolerably deep borings through the upper, and indeed this has been already successfully demonstrated.

The mesozoic age in Kansas is represented solely by cretaceous formations, which, however, occupy the largest area of any in the State, being no less than 40,000 square miles. The series is composed of three divisions—the Dakota, Benton, and Niobrara, all belonging to well-recognised lower members of the cretaceous rocks of the Upper Missouri region. The Dakota beds consist of sandstone interbedded with variegated shales, with occasional layers and pockets of impure coal. The sandstones are permeated and deeply stained with ferruginous matter, the iron being often concentrated around nuclei, forming singularly shaped concretions. The proximity to the ancient land area is denoted by the rather extensive fossil flora usually found in these concretions, but the fauna is more limited in variety, comprising, so far, a few fishes, a large Saurian, and several pieces of mollusks. The sandstones vary lithologically, but are usually compact, and often intensely hard, forming highland ridges marked by rugged and picturesque features. Less is known of the Benton beds than of the other members of the series. They consist of argillaceous and calcareous shales, with thin layers of limestone, overlaid by dark-coloured shales, but good exposures of these rocks are rarely found. They have, however, yielded to the paleontologist several Saurians, while the limestones are frequently charged with fine ammonites, the shells of Inoceramus, the gigantic Haploscapia, and myriads of the little Ostrea congesta. The Niobrara beds are the most important of the Kansas cretaceous formations, and offer much better marked horizons. The lower portion shows alternations of fragmentary limestone and shales, which above pass into shelly limestone, and in some localities into chalky limestone. All these layers are charged with a wonderfully numerous and varied vertebrate fauna, allied to forms which are common in the Colorado shales of the Rocky Mountain region, and consist of remains of Tetrapods or common bony fishes, sharks, Saurians, and an extraordinary species of bird, whose jaws are armed with teeth. The mineralogist will also be interested in these beds, as furnishing beautiful examples of selenite crystal. From a landscape point of view, also, the Niobrara beds are instructive, as they are frequently intersected by miniature canyon labyrinths, and exhibit varieties of monumental forms detached by the erosion of the valleys; some of these, composed of a coping of limestone and a shaft of chalk and compact shale, rising from 20 to 70 ft. in height. In an economic sense the cretaceous series is of considerable value. The Dakota deposits contain three beds of lignite, the Benton shales yield quantities of septaria, used for making the finer qualities of cement, together with excellent chalk applicable for whitening, while the Niobrara beds furnish vast supplies of pure lime. All the divisions yield excellent building stone, and throughout the formation a productive supply of salt occurs, from the brines of which there is already a brisk annual trade of 35,000 bushels.

The most recent formation of Kansas is principally in the north-west of the State, where there is a kainozoic area of pliocene beds of about 11,500 square miles, extending thence from Colorado and Nebraska, where a vast stretch of country is occupied by the White River formation. Its typical features are loosely aggregated sands, more or less calcareous, forming irregular strata of brown and grey sandstone, while in some places siliceous beds occur, associated with several varieties of chalcopryite, and containing fragments of the tusks of a very large mammal. The fauna is most interesting in this respect—beaver, rhinoceros, camel, deer, wolf, and turtle being all represented. The district is noted for its eroded mounds and columns, the most striking being the Sheridan Buttes, which rise in perfect isolation to 200 ft. above the Smoky Hill river, the summit capped by a heavy ledge of light grey, very hard siliceous rock, which has been weathered into miniature grottoes in the higher of the two cones. Underlying the pliocene beds is a thick deposit of chocolate-coloured shales, with concretionary masses of limestone and septaria, and splendid crystals of selenite. Among post-tertiary deposits, examples are to be found, in the eastern portion of the State, of the drift and loess, the latter being strikingly displayed in the bluffs that bound the Missouri river valley for so many hundreds of miles in the States of Iowa, Nebraska, Kansas, and Missouri.

## AUSTRALIAN SILVER MINING—THE NEW SILVER DISTRICT IN THE BARRIER RANGES.

New South Wales can boast the possession of one of the richest silver-producing districts in the world. It is situated in what are designated the Barrier Ranges, near where the colony joins South Australia; but is at present extremely difficult to reach in consequence of the absence of ordinary travelling accommodation, though the road is described as being much better than the average Australian bush track. The country through which the coach passes is purely a saltbush one, and in dry weather natural feed for cattle is scarce. The existence of silver-bearing ores in the district was first discovered by a shepherd in the year 1876, whilst out with his mob of sheep on the range. He brought samples of the ore to some of the local magnates; but, as their nature was little understood, the treasure lay undisturbed until a Mr. Green raised some of it with the intention of sending it to England. Through some mishap in transit no returns ever came to Mr. Green. About two years ago, however, another lot of ore was shipped to England to be sold, this time with better results, though through inexperience the miners selected the lowest grade ores—argenteriferous galena, leaving out the rich sulphides of silver. They netted the handsome return of 7½ per cent on the shipment, after the highest commissions and charges had been exacted. Miners who were working silver properties in these parts were all making money before they sold out. The influx of miners has naturally aided in the erection of a township, first known as Silver City, but now officially designated Silverton. It is situated six miles east of the old border township known as Thackaringa. In an interesting report, prepared for a colonial syndicate, Mr. W. R. Fitzgerald Moore, M.E.C.E., states that the hills in the vicinity of Silverton, many miles to the north, slope to the east and west, and descend boldly to the plains of the great depression, which, with a few breaks, stretch to the sea on the west, and for hundreds of miles in an easterly direction, whilst their course of strike is almost in a due north line. They continue without a break until they sink under the great Queensland plains.

The average width of the main range proper is perhaps about three miles, although no actual main width can be arrived at, because of very unusual variety of form. Numerous creeks take their rise in these hills and out transversely through the valleys. During the wet season, or rather after a thunderstorm, the drainage which flows from both sides of the range is, as a rule, captured in the large tanks or dams belonging to the great sheep runs in the district. Although in some cases in the middle of these ranges the hills rise to considerable peaks, yet, from geological accidents, their summits deviate to one or the other side, but seldom if ever overhang the table-land in precipitous peaks, as the same class of formation to be seen in many parts of the Sierra Nevada. The valleys are seldom

continuous for any great distance; but are divided by spurs of the ranges, which invade them from one side, and by low volcanic groups which push out from the other. From the summit of the highest hills may be seen vast stretches of saltbush country, appearing in the distance like great naked deserts, only varied by beds of saline efflorescence, from whence, in the blazing heat, columns of parched air whirl upwards, laden with acrid dust and drifting sand. It is almost impossible to conceive a prospect of more stern desolation than may be viewed from the crest of these ranges; indeed, the eye is only relieved by threads of green which skirt the water-course. Over the whole of this great mountain chain are found localities of the precious metals, and following their leading structural idea they arrange themselves in parallel zones of a similar nature to those of the Cordilleras and California. Approaching the range by the south-west, the great talc schist formations crop out in wonderful profusion. The general strike in this part is about 30° west of north, and it is curious to see immense stretches of well-defined dioritic reefs cutting them at an oblique angle on their course to the north-east. Further to the north the range is composed of crumbled and uplifted strata, varied by immense barren quartz outcrops and gigantic dykes, and also by ancient eruptive rocks, which no doubt accompanied the upheaval. Where the section of the formation can be examined there can be seen folds of more or less complexity, twisted and warped by longitudinal forces, and often compressed into a series of zigzags of a wonderful nature. These are a few of the characteristics of the silver-bearing parts of the Barrier Ranges.

The mines of this district consist of two groups. The one at Silverton embraces 11 claims, in which the ore consists of sulphides of lead or argenteriferous galena. The profits secured on these ores amount to 12½ per cent. About eight of these mines are opened up, six of them to a considerable extent. There is one shaft down 130 ft., carrying the lode very strong in the bottom. The lode at this point gives indications of turning from sulphides of lead into sulphides of silver: 15 shafts have been sunk on different parts of these 11 mines, their depth varying from 30 ft. to 75 ft., one being 130 feet. The lode is disclosed in each of these shafts, and found to be of a thickness varying from 1 ft. to 3 feet. Some rich returns are now being obtained from these mines, the ore yielding, as above stated, a clear profit of 12½ per cent. The second and larger group of mines is situated at a distance of 28 miles from Silverton. They are called the Lakes Camp group. The ores here are purely sulphides of silver, and very rich. Two tons of ore recently sent to England for assay were sold for 600£. Shafts have been sunk in many parts of the ground held by the syndicate, and ore has been discovered everywhere; but, of course, all of it is not of the richest quality. The shafts vary in depth from 10 to 75 feet. In one put down on a big bonanza the lode is found to be of enormous value (300£ per ton), and it is said that a great portion of the money paid by the syndicate for the entire ground has already been secured to them in profits from this one shaft. The lodes have all the appearance of permanency. In one shaft, the deepest of this group, the lode has been traced to the total depth, 75 ft., and at the bottom it is 6 in. thick, with indications of continuance and improvement. A great drawback to the rapid development of these mines is the scarcity of labour at Silverton.

## FRENCH DICTIONARY—GENERAL AND TECHNOLOGICAL.

One of the earliest enquiries of young mining and engineering students seeking to make themselves masters of the French language is for a reliable dictionary which will enable them to read and translate the technical papers contained in the Transactions of the scientific societies connected with their profession, and for some time past it has been necessary to tell them that the only dictionaries even claiming to render them assistance with regard to technical terms were the triglott of Karmarsch and the triglott of Tolhausen. The first of these in actual use is found to render very little assistance. The contributors have attempted to give the corresponding terms in three languages, though possessing an insufficient acquaintance with two of them, whilst the fault of Tolhausen appears to be due to the author having attempted to perform the whole of the work without assistance, though he possessed but a partial knowledge of either English, French, or German, so that he gives as synonyms in the same language expressions which represent distinctly different things. To mention, for example, a definition in which we may be supposed to be able to pronounce an opinion. Tolhausen renders *Encoir*, *toucher la forme*, to ink the type, to distribute the ink, whilst the correct expression is to ink the forme, and, therefore, might have been omitted from a technological dictionary altogether. To distribute the ink means quite another thing. Similar mistakes and eccentricities are found in every page; but these will suffice to indicate the kind of assistance which the student has been accustomed to receive.

But apart from the incorrect rendering of technicalities inserted, there has also been the objection that for any word not regarded by the author as a technicality, it has been necessary to refer to another book. Among general dictionaries that of Dr. Spiers has always enjoyed a high reputation, and that reputation will be even augmented by the completion of the new edition just issued—A New French-English General Dictionary. "Nouveau Dictionnaire Général Anglais-Français." Compiled from the French dictionaries of l'Académie, Bescherelle, Littré, &c., and the English dictionaries of Johnson, Webster, Richardson, &c., and the technical works in both languages. By Dr. SPIERS, agrégé de l'Université. Twenty-ninth edition, entirely remodelled, revised, and largely increased. By H. Witcomb, successor [as professor of English] at the Ecole des Ponts et Chaussées. London: Sampson Low, Marston, Searle, and Rivington, Crown Buildings, Fleet-street. Although designated the twenty-ninth edition for the purpose of retaining the seniority to which the work is entitled, the present is in all, except the general plan, a new dictionary. New matter collected by Dr. Spiers to the amount of 160 additional pages of print has been incorporated, and Mr. Witcomb has bestowed even greater labour upon it in bringing the information down to the present day. As to the accuracy of the work, the best test is that obtained in the use of it; but if it be as correct as previous editions the student will find nothing to complain of. Making a large number of haphazard references the rendering appears to be admirable, though there are naturally some few slips; for example, an entire paragraph has been omitted in the middle column of page 95 of the French-English part—the substantive *Borne*—since the 25th line of the column mentioned should obviously mean: *Borne kilométrique*, and not *Bornage kilométrique*. We mention this not as coadunatory of the dictionary, but to indicate that we have given it a pretty severe testing. On the whole, the dictionary is well worthy of commendation, the number of technical words introduced is very large, and the phraseological portion of the paragraphs is well selected and well rendered. We should have no hesitation in relying upon the volumes in making the most important translations, and do not doubt that we should be able to give a Frenchman a fair idea of an English author's meaning, or to permit an Englishman to comprehend the views of a French writer upon either general or technical subjects.

AUSTRALIAN JASPER.—This description of precious stone is very abundant and widely distributed throughout various parts of New South Wales. It is found of nearly all shades of colour—pure white, grey, slate, dull blue, olive and bright greens, brown, red, and black, both alone as simple colours, and in varied combinations of stripes, streaks, and mottlings. It is found mainly in the form of boulders and pebbles in river beds, and it enters largely into the composition of nearly all conglomerates, gravelly alluvial deposits, and river drifts. Much of it is evidently derived from the conglomerate of the coal measures. Amongst the principal localities are the Gwydir, the Macintyre, the Richmond, the Macquarie, Cudgong, the Hunter, the Murrumbidgee, and many of their tributaries. There are large quantities of fine red jasper near Gobolion, county Ashburnham, and at Soone, county of Brisbane. The drifts at Mudgee, in the county of Phillip, at Bathurst; Bingera, county of Murchison; Lake George, county Murray; Molong, county Ashburnham; Woolomon, and other places are rich in fine jasper specimens.

# ENGLAND'S INDUSTRIAL SUPREMACY IN THE MANUFACTURE OF IRON\*—No. IV.

BY SIR FRANCIS C. KNOWLES, BART., M.A., F.R.S.

But after all the great question of the ability of Belgium to supplant England in the great iron market of the world is not to be solved by pointing to the picturesque in the Charleroi district, as compared with our own Black Country, or to the social habits and deportment of the working class, but by the hard facts of comparative physical power in the men, and the value of the work obtained for their wages. Now Messrs. Creed and Williams state a fact, and a very important fact it is—"The wages of all classes of workmen (in Belgium) are, however, very low, lower throughout the scale indeed than in Wales, where the rate rules lower than in any other part of the United Kingdom." In this little sentence we think lies the antidote to the gloomy forebodings expressed by Messrs. Creed and Williams for the future of our iron industry. Why is the rate lower in Wales than in Staffordshire for example? It is because the labour of the Staffordshire man is positively worth more, earns more profit than that of the Welshman, as anyone might anticipate who should see the differences in the two races, and in their habits of body, their diet, &c. And so it is between the Welshman and the Belgian. It is physically impossible that they should have the same power of endurance under the severe labour of the furnace, the forge, and the mill; that a man fed upon the weak, washy diet of the Belgian puddler, for example, supplemented by gouttes of gin, and other excitants, should labour long at the furnace without a complete and rapid break up of the constitution. What must be the children and the descendants of such men? A poor woman, the wife of a man less severely employed (in zincworks), hearing the writer say that "It was feared the Belgian labourer would beat the Englishman out of the market," exclaimed, "Beat the English! Why, Sir, our men have not half enough to eat to do their work. Look at their poor faces, they are like old wood." Beat the British labourer! why you might as well say that a costermonger's half-starved hack, or donkey, would beat one of Barclay and Perkins's magnificent dray horses. The writer has seen men in the mills dining on a few potatoes, either roasted in the ashes or cold, done with fat, and washed down with weak coffee, and this is not on the fast days, which are numerous. A friend of the writer's, the head patron of a large work where tin-plates are made, one day said to him, "How is it—I have the best machinery and buildings, I use the best coal and pig metal, and employ the best workmen, and I adopt all your newest methods, yet I cannot compete with your people?" The writer answered, "That horse of yours is a fine animal and works well, how do you feed him?"—"Why, on the best oats, beans, and hay." "Good! and he works well?"—"Very well." "But if you were to feed him on indifferent grass could he stand his work then?"—"No; to be sure not." "Then why do you expect your men to do what you say your horse could not do?" The patron was silent for a minute or two, and then quietly answered, "I see you are right, but say nothing about it." The writer has seen rollers make two, three, four attempts before they could get a heavy bar up to the rolls! What is said of the inability of the Belgian puddler to work the English iron is quite true—it is too heavy for him. More than this, the writer happens to have witnessed some experiments in the Belgian puddling furnaces directed to the purifying of the metal from sulphur and phosphorus, and so far giving it the quality of our metal. The men complained of the additional labour which it required, and though bar iron was produced which could be twisted into a corkscrew either cold or red hot, yet the method was not adopted, the pretence being some extra 3s. 6d. or 4s. cost, though the iron was worth at least 10s. more, the fact being that the men could not work it in its purer condition. We have seen a waste of labour and material in the form of boiler ends made of red short iron, all cracked on the surface, which would terrify an English ironmaster. This is due entirely to the great uncertainty of the produce which anyone would look for if he knew the nature of the ores and fuel.

But it will be said, "What is the use of arguing thus, or even stating these facts, in face of the fact that the Belgians have cut us out of a contract for 40,000 tons, and are actually selling their iron in England?" We do not dispute the facts as stated, but we should like, waiving all question as to whether it is not purely an accident due to the mismanagement of their price list by the trade—we should like to know something more of the circumstances of this contract. What was the sample sent to induce this contract? Was it in truth of Belgian produce? and, if so, has the contract been executed fairly according to sample? The writer of this knows something of Belgian commercial morality. He knows that in that country people trading on the known character for superiority of British goods are inundated with Belgium with falsified goods bearing the forged trade marks of British producers. You may buy "Morning" pins (Anglic "mourning") and "Windsor Soap" made near Brussels; "real" English knives and razors made at Namur from "real" English steel imported scarcely cold from Germany, and a host of fraudulent manufactures. We do not wish to bear hard upon our good friends and neighbours, but as we happen to know that while the chiefs of a large ironwork in Belgium were in treaty with one of our own countrymen by day, for the use of a patented process, they and their employers were busily occupied in the infringement of the process in the dead of night, and were condemned for it in a heavy penalty and costs. As we know this we must be excused for attaching little importance to their getting that Dutch contract until we know a little more about it, though it has so much alarmed our countrymen, Messrs. Creed and Williams.

There can be no doubt upon the statistics of the Belgian Government that the Belgian industry in iron has made great progress in the last 16 years, but surely that is no cause for such alarm. It must be borne in mind that the art in its perfect state was imported all at once from England as a new field for commercial enterprise. Then came the railroads, supported by British capital and labour, to create a demand for the material produced, giving an enormous impulse to population and to manufactures of every kind, which gathers intensity every hour even at this moment. It would be wonderful indeed if this industry were not in process of more rapid development than our own. The growth of a boy is always more striking than that of a man whose physical development becomes slower as he advances to maturity.

But the whole produce of Belgium in iron, good, bad, and indifferent, is not 10 per cent. of that of England, and when the very large deduction is made for her own consumption and growing wants of the material, what can be left to supply the immense foreign demands upon the forges of Europe, England included?

But, say Messrs. Creed and Williams, the loss of our supremacy in this branch is to be brought about slowly and surely by the evil action of the trades unions, and the warfare between labour and capital in strikes and lockouts, while the industry of Belgium grows at our expense. Is it so? It is a most unhappy commentary upon this prediction, that while we write the soil of Belgium is still red with the blood of miners and ironworkers shed in an insurrection made in carrying out a strike at Marchiennes-au-Pont and Montigny-sur-Sambre. A strike implies a common purpose; an insurrection requires concert and organisation. From this, however rude at first, the step to trades' unions is narrow indeed. Leaders will appear, the mass will follow as with ourselves, and in a nation with military instincts and tendencies, and a greater aptitude for organisation than our own it is not difficult to see what must follow. The unions will gather power and extend themselves as in England, and will run the same round with the same results. The movement has actually begun, and once going nothing in a free country can stop it until masters and men have learned to determine and regulate their relations by the sound laws of political economy.

We turn now to take a bird's-eye view of the resources in minerals, in capital, and in labour, applied with science, intelligence, and unflinching perseverance in our own great country; for they are far too unbounded for any other view. We cannot do better than preface what we have to say by quoting the opinion of M. Valerius,† a dis-

tinguished Belgian savant, who was not likely to show us much partiality on the subject. He says—"These details show sufficiently the immense advantages of the English ironmasters over those of other countries, especially of Belgium. The mineral riches of no country are comparable to those which England presents, where the iron ores and the fire-clay lie in the very bosom of the coal veins; while in Belgium, for example, these essential elements of manufacture are met with only on the confines of the coal basins which compels onerous transport. In Wales, in Staffordshire, in Yorkshire, in Scotland, above all, the price of coal is generally from 40 to 50 per cent. lower than in Belgium, and we have not yet met with in the latter country the variety of lean or dry coal, which is employed with so much advantage in Scotland in the manufacture of cast metal with hot blast. Lastly, no country in the world offers for the export of her produce resources such as England has at her disposal." We wonder what M. Valerius would say of the application of the Newcastle coal field to the smelting of the ores of Cleveland, Northampton, and Lincolnshire, not to mention any others!

The aggregate of the British coal field may be stated as consisting of 476 workable seams, with a thickness of 1260 ft., and this exclusive of Ireland, the Cleve Hills in Shropshire, and some parts of Scotland, and above all of the large tracts not yet proved, but geologically probable in the Midland Counties, and tracts of anthracite untouched in South Wales, &c.

Dr. Lyon Playfair, in his elaborate and valuable report to the Admiralty on the British coals, gives the following summary of their average composition:—

Locality.	Average of samples.	Specific gravity.	Carbon, gen.	Hydro. gen.	Nitro. gen.	Sulphur.	Oxygen.	Ash.	Per cent. age of coke.
30. Wales	1.315	83.78	4.79	0.93	1.43	4.15	4.91	72.63	
12. Newcastle	1.256	82.12	5.31	1.35	1.24	5.69	3.77	60.67	
28. Lancashire	1.273	79.90	5.32	1.30	1.44	9.53	4.88	60.22	
8. Scotland	1.259	78.53	5.61	1.00	1.11	9.69	4.03	54.22	
7. Derbyshire	1.292	79.68	4.94	1.41	1.01	10.28	2.65	59.32	

It will be obvious to remark upon this table that in only one case, that of Scotland (where raw coal can be used in the furnace), is the yield of coke per cent. below that of the best in Belgium, while in point of purity from sulphur, the prime point, these coals are absolutely more pure than the Belgian coke, and it must be borne in mind that one-half of the sulphur disappears in the coking. Some of the Welsh coals yield as much as 88 per cent. of coke, while they contain only 33 per cent. of sulphur. The ashes, too, of the best coals are a most valuable flux to the iron ore, the alumina exceeding the amount required to saturate the silica. (Phillips's analysis.)

We have no hesitation in affirming upon this point that if the most sulphurous coal in the kingdom, that of Resolven, in South Wales (which yields 84 per cent. of coke), containing 5.07 per cent. of sulphur, were to be treated as coals are at Charleroi and elsewhere in Belgium, by washing, &c., they would be at least as pure in the form of coke as the best of the latter country, and incomparably cheaper.

Of this magnificent array of combustibles fit for the manufacture of iron, many admit of coking upon the open ground, as in Staffordshire, Shropshire, the Forest of Dean, &c., saving the cost of coke ovens; and many, as at Merthyr Tydvil, in South Wales, and in Scotland, may be used in the raw state.

It must not be forgotten that we have large deposits of anthracite or stone coal in Wales containing 93 to 97 per cent. of carbon, a natural coke of great density, practically free from sulphur, with which the strongest and best pig-iron is made. This coal is destined yet to have its future in our iron industry as soon as means are devised to obviate its tendency to decrepitate in the furnace, and to accelerate the descent of the charges.

## IRON ORES.

We pass on to the resources of our country in iron ores, and here we find the same *embarras de richesse*, if not a greater, as we did in the case of fuel. Besides the ordinary ores of the coal basins, with an unimportant exception, interstratified with the series of coal veins, and offering every variety of earthy composition for the due adjustment of the furnace charges, we have the vast deposits of Yorkshire, Northamptonshire, and Lincolnshire—one of which would outline the whole iron ore produce of Belgium—the powerful veins of red and brown hematite occurring in South Wales, North Wales, Somersetshire, Devonshire, and Cornwall, Cumberland, Lancashire, and in Scotland. The writer has himself analysed some of the peroxides of iron of Cornwall, Devon, and North Wales, and found them to contain, besides above 60 per cent. of iron, pure carbonate of lime; so that in the total absence of silica they could be used to economic so far, if not to dispense with, the use of limestone in the furnace charges. A few years ago the writer made a mineralogical tour in Devon and Cornwall, and was astonished to learn that iron ores were there looked upon as a drug. In one spot he saw *in situ* a fine vein of sparry carbonate of iron containing 48 per cent. of iron, with manganese and lime, a true *stahlstein*, exactly resembling that worked near Siegen, in Prussia. This was being sold at 2s. 6d. a ton to mend roads! He found also powerful veins of the ore of Elba (that smelted in Tuscany, in the Cecina furnace), and veins of magnetic iron ore not inferior to that worked at Dannemora, in Sweden. All these ores admit of easy transport to the sites of the coal and ironworks where they may be required, and at no prohibitory cost.

## PICTURESQUE WALES.

It may be assumed that shareholders in mines are in the habit of enjoying an autumn holiday as well as other people, and as many of them might like to learn something of the appearance of mining districts if they could do so without being too much troubled with smoke and steam-engines Wales would probably be suggested as a region to meet the case. The Welsh mining districts are by no means the least beautiful in the world, and in Picturesque Wales, a handbook of scenery accessible from the Cambrian Railways, edited by Mr. GODFREY TURNER, and just published by the executive, will enable the tourist who may visit the locality to see some of its principal beauties in the shortest possible time. To the readers of the *Mining Journal* many of the names of places will be very familiar, whilst to give an idea of the manner in which the descriptions are given we may make an extract, referring to the neighbourhood of Aberystwith.

Legend apart—and especially banished from historical consideration, being the old wife's tales of Megan Llandunach, who made a shrewd bargain with Satan—the building of Pont-ar-Mynach is a question lying between the Knights Hospitallers and the Monks of Strata Florida. Like the St. Gothard Bridge this over the falls of Mynach has a stronger roadway built above it, the original bridge having been condemned as dangerous in 1752. After crossing the bridge the guide who accompanies you from the hotel will conduct you through a gate on the right hand, and then down a rough zig-zag series of rocky flights of stairs, protected by rustic hand-rails of pine wood. At the bottom, or on a ledge as low as you can descend, you have the Mynach fall leaping and roaring downward, till it whirls dizzily beneath your feet into a smooth hollow of its own shaping, called the Devil's Punchbowl, and out again on the opposite side. You ascend now to the road, and cross to another gate on the left hand, walking northward from the bridge. In visiting the Mynach fall you were in a deep chasm, like a giant's well. The scene is very different on the other side. There a wide glen, steep it is true, but expanding in bold irregularities, stretches before you. Once more you descend by many winding steps, and gain views of the Mynach and Rheidol falls rushing to a wild embrace or wilder conflict. To the lowest point of view the descent is by a straight and steep flight of rugged steps, known as Jacob's Ladder. Though there is no real danger, and the spot is innocent of any recorded calamity, it is not without a tremor that the nervous pilgrim of the picturesque looks down the staircase he is bidden to descend. It is necessary that he should do this, in order to view the Mynach and Rheidol falls in all their grand diversity.

If we return from the Devil's Bridge by the ordinary round of the coaches—that is, by Pont Erwyd—we shall see something of the Goginan Lead Mines, or at least, in passing, notice the great water-wheel, which is one of the largest in the kingdom, and buy for a few half-pence from the little Welsh gamins who run by the side of the

carriage specimens of the ore. All along the road, through Goginan and Llanbadarn, the scenery is fine, though different in respects from that which we saw in going by the southern road the Devil's Bridge. Especially striking are the views of lake and wooded heights on the right hand after passing the lead mines Goginan. Our visit to Pont-ar-Mynach, in whatever manner we have varied the route, cannot fail to be one of those trips on which the recollection lingers in after time. While in the vicinity the ascent of Plynlimon should be made, if for no other end than the beauty and wildness of the views which it commands. By carriage an altitude of 1360 ft. is gained at Steddfa Gurig, a small cluster of houses where a mountain tributary of the Wye divides North from South Wales. Dismissing the conveyance you continue the ascent on foot by a mine road which runs along the northern side of the Tarew when it ceases, and a line of poles marks the way to the summit, which is a cairn, or large heap of stones. The view hence includes nearly all the counties of Wales and portions of Shropshire and Hereford, with Snowdon and Cader Idris, and the coastline of Cardigan Bay from Bardsey Island to St. David's Head: 700 ft. below the summit, in an immense rocky basin, lies Llyn Llygad Rheidol, the source of the river as well as of the Aberystwith water supply already mentioned. Though lacking the altitude of Snowdon and the ruggedness of Cader Idris, Plynlimon is interesting as being the source of the Severn and Wye, the Rheidol, Dulas, and Llyfnant rivers. Historically it is connected with the last struggle for Welsh independence, under Owain Glyndwr. On Mynydd Hyddgen, with a body of 120 men-at-arms, this famous chief defeated 1500 of Anglo-Norman and Flemish adversaries.

The book throughout is written in an easy and entertaining style, and is so admirably and freely illustrated that those who take it in their guide, whether they be or be not acquainted with the district will find it an agreeable companion, and one that will add materially to the enjoyment of their visit.

## THE TURKISH EMERY MINES.

For many years, says the United States Consul at Smyrna, in reporting to his Government, one or two parties holding concessions from the Government maintained a virtual monopoly of the emery mining industry, and kept up prices accordingly, the rough emery being sold at the rate of 16l. per ton. To-day 5l. per ton is an average price. How much of this falling off in price is due to competition, deterioration, or decrease of consumption, can only be estimated. The mines are worked either under firmans, or concessions obtained from the Government only with difficulty and large expense, or through contracts made with the estates of the Ottoman, known as *vacouf*. In the latter category are the mines Gumnah Dag, near Sokia, and about four hours distant from the station of Azizie, on the line of the Ottoman Railway, which station is about seven miles from Ephesus. These mines pay to the Government a royalty of so much per ton on all the ore extracted, which transported on mules and donkeys to the station at Azizie, and thence to Smyrna by rail. The road from the mines to the station being very rough and over mountains, camels cannot be employed, a serious drawback, inasmuch as the carrying capacity of a mule is only equal to about one-ninth of a ton.

The quantity of emery yet unmined in these quarries of the Gumnah Dag is large, but the quality is below the standard. The Turkish Mines, known as the *aligoli*, are located on a range of hills between Cosbunar and Thyra, within 4½ hours by camel from Cosbunar station on Ottoman Railway, 40 miles from Smyrna. They are operated by several parties under concessions from the Turkish Government for a term of 99 years. Formerly large quantities of excellent emery were taken out, but of late years it has become difficult to extract the ore, which is conveyed on the backs of donkeys to the plain. At the foot of this range of hills is the Courasck large irregular bed of emery, not a lode, mixed with earth. It is easy of extraction, no powder being required, but is covered from 15 to 25 ft. of silt, the accumulation of ages. Much of this inferior quality of stone finds a market in Germany and the United States. In all emery deposits there is a risk of a sudden exhaustion of the ore. This fact, taken in connection with the difficulty of securing concessions, the peculiarities of Turkish laws, and the duty of 20 per cent., calculated at the selling price in Europe, do not encourage enterprise in the direction of opening up new mines, or deepening old ones, although experience proves that the emery comes from the greatest depths.

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† "Fabrication de la Ferre." Bruxelles, 1851.

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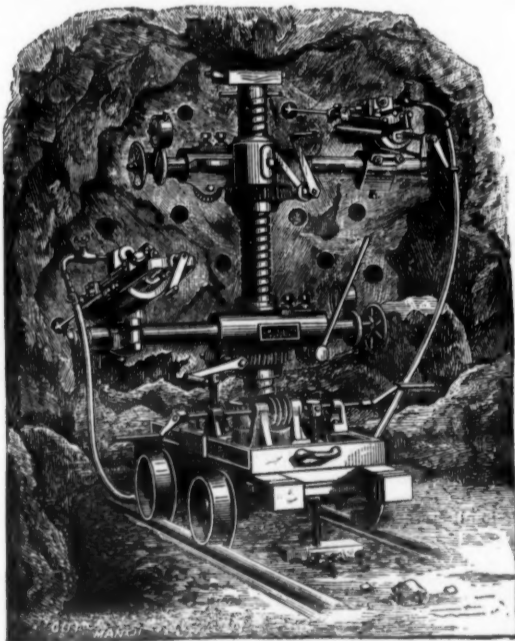
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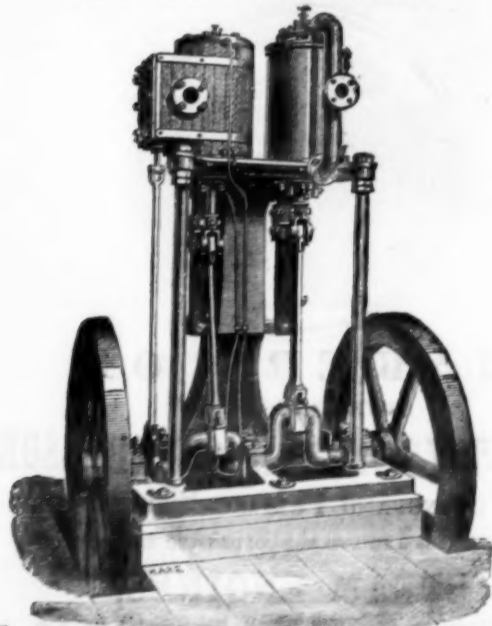
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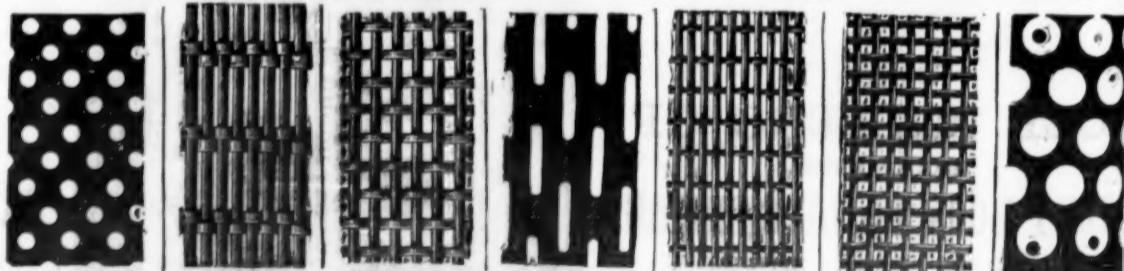
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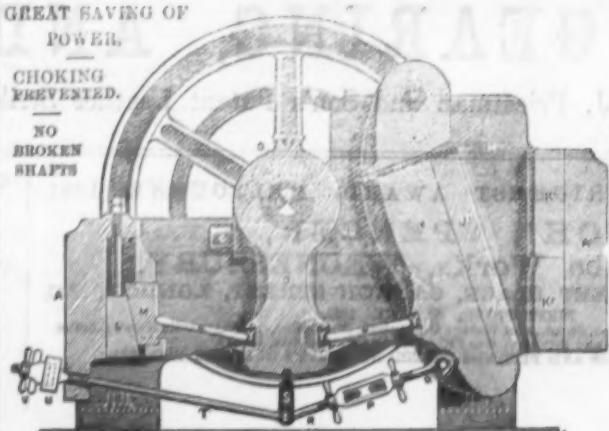
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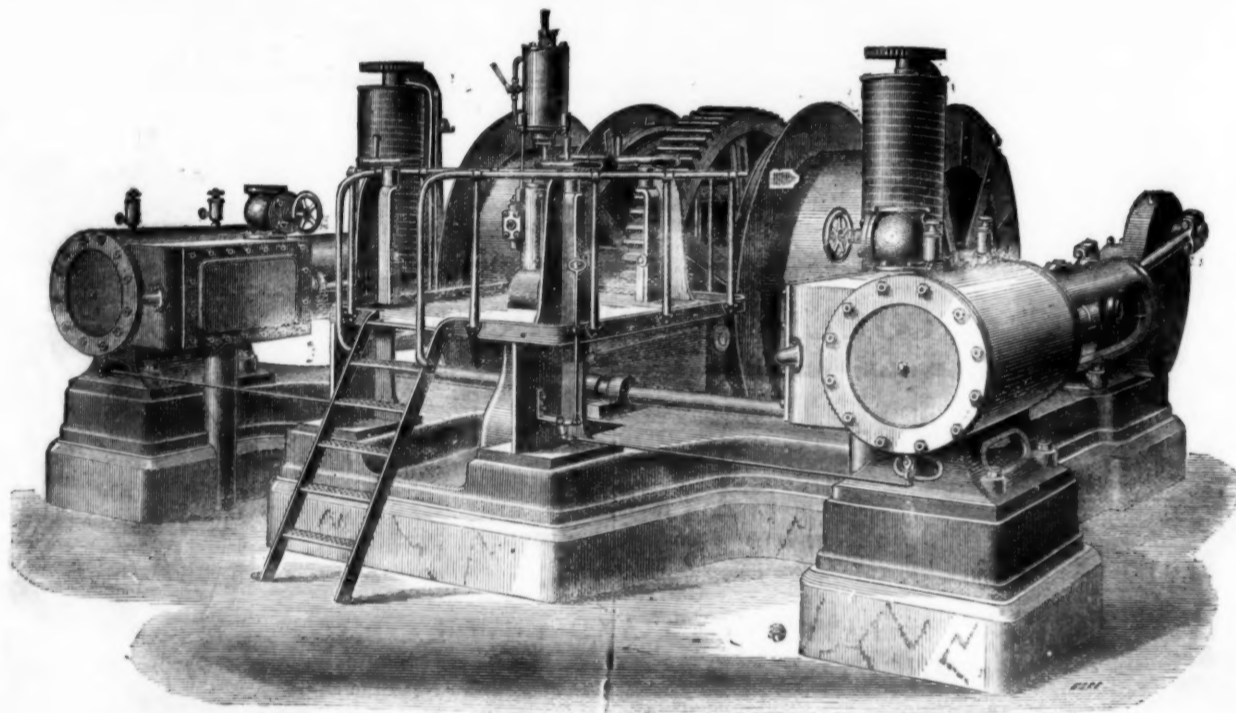
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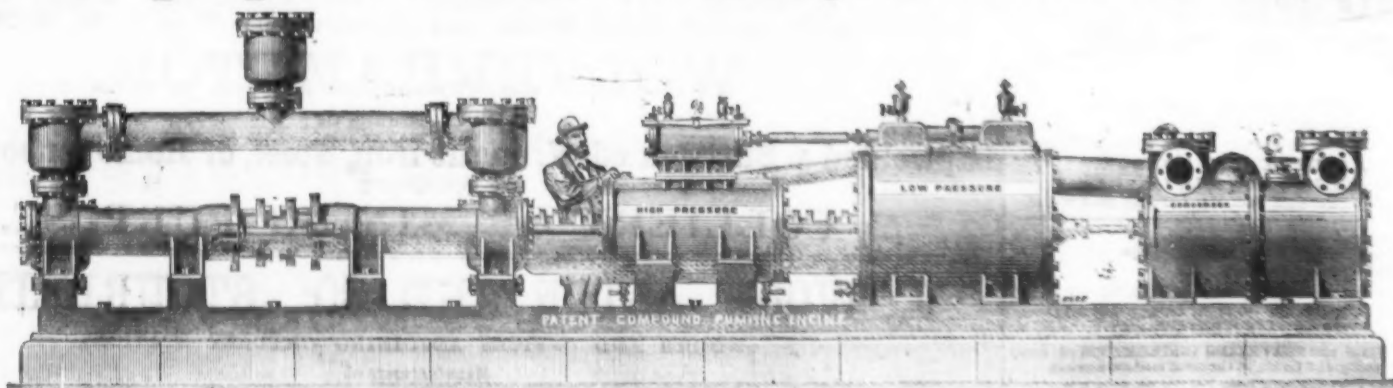
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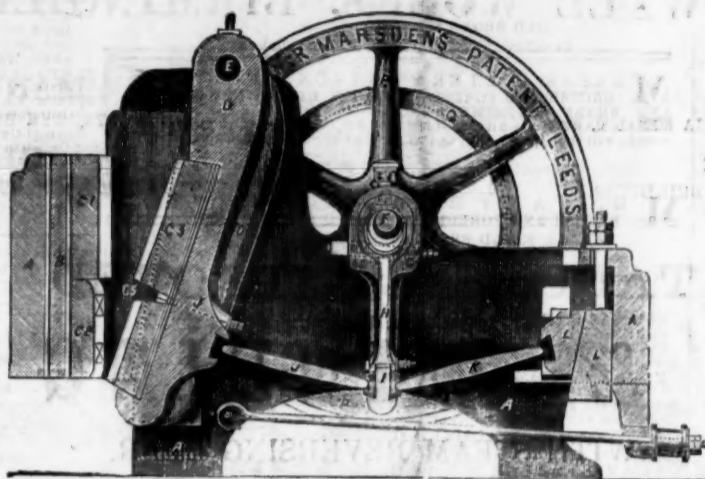
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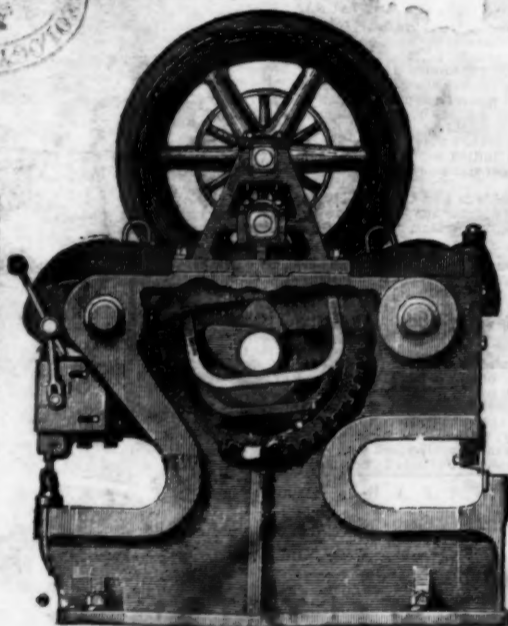
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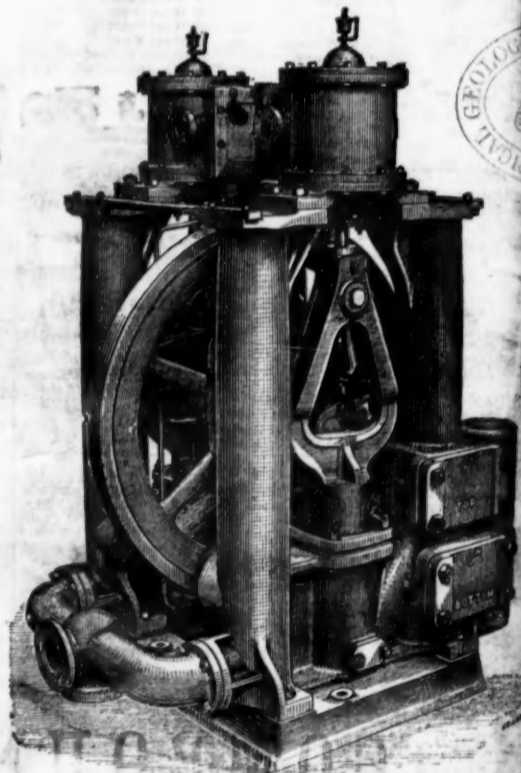
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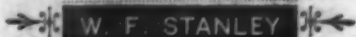
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(WORKS AND OFFICES ADJOINING CRADLEY STATION),

Manufacturers of

**CRANE, INCLINE, AND PIT CHAINS,**Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADE  
FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS,

RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &amp;c., &amp;c.

Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions

**WELDED STEEL CHAINS { FOR CRANES, INCLINES, MINES, &c.,  
MADE ALL SIZES.**